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DUKE ENERGY®

October 2, 2017

VIA ELECTRONIC FILING

M. Lynn Jarvis, Chief Clerk
North Carolina Utilities Commission
4325 Mail Service Center
Raleigh, North Carolina 27699-4300

RE: 2017 Smart Grid Technology Plans of Duke Energy Carolinas, LLC and Duke Energy Progress, LLC
Docket No. E-100, Sub 147

Dear Ms. Jarvis:

Pursuant to Commission Rule R8-60.1, I enclose the 2017 Smart Grid Technology Plan Updates (collectively, the "SGTP Updates") of Duke Energy Carolinas, LLC ("DEC") and Duke Energy Progress, LLC ("DEP") (collectively, the "Companies") for filing in connection with the referenced matter.

Portions of the cost/benefit appendices to the DEC and DEP SGTP Updates contain confidential information that should be protected from disclosure. Of the exhibits contained in Appendix C, Exhibit B to the DEC SGTP Update and Exhibits B, E and G to the DEP SGTP Update contain cost information for installations currently underway or planned in the near future. Public disclosure of this information would impair the Companies' ability to procure equipment and services necessary to initiate future projects on advantageous terms for the benefit of its customers. Thus, the Companies respectfully request that the confidential information be treated confidentially pursuant to N.C. Gen. Stat. §132-1.2. DEC and DEP will make this information available to other parties pursuant to an appropriate confidentiality agreement.

Thank you for your attention to this matter. If you have any questions, please let me know.

Sincerely,

Lawrence B. Somers

Enclosures

cc: Parties of Record

CERTIFICATE OF SERVICE

I certify that a copy of 2017Smart Grid Technology Plan Updates of Duke Energy Carolinas, LLC and Duke Energy Progress, LLC, in Docket No. E-100, Sub 147, has been served by electronic mail, hand delivery or by depositing a copy in the United States mail, postage prepaid to the following parties of record:

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This is the 2nd day of October, 2017.

By: ______________________

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Duke Energy Carolinas

2017 Smart Grid Technology Plan Update

DUKE ENERGY
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Overview

As required by the North Carolina Utilities Commission (NCUC or Commission) Rule R8-60.1(b), Duke Energy Carolinas (DEC or Company) submits its 2017 Smart Grid Technology Plan (SGTP) Update. The 2017 SGTP Update represents the significant amendments or revisions to the 2016 Smart Grid Technology Plan.

1. Smart Grid Technology Strategy

Reference	Requirement
R8-60.1(c)(1)	*A summary of the utility's strategy for evaluating and developing smart grid technologies.*

Power/Forward Carolinas Grid Improvement Plan

Announced in 2017, the Company outlined its plans over the next decade to modernize the North Carolina grid. Power/Forward Carolinas is comprised of strategic programs that will each play a part in building a smarter energy future for customers. These strategic programs represent the means to deliver the Road Ahead strategies of modernizing the power grid and transforming the customer experience, as outlined in the 2016 SGTP. The early years of Power/Forward Carolinas will establish the foundational and enabling infrastructure and technologies to achieve the Company's long-term objectives of a more reliable, resilient grid to better serve customers.

Certain programs included in the Power/Forward Carolinas initiative are technologies that fall under the definition of "smart grid technologies" outlined in Commission Rule R8-60.1(c), while others are not. All of the programs have similar objectives in the long term, improving reliability and resiliency of the grid; however, certain programs, like Targeted Undergrounding, are not deemed smart grid technologies. The Company has determined that the Self-Optimizing Grid, and certain portions of the Enterprise Systems Upgrades, Communications Network Upgrades and Transmission Improvements programs, meet the criteria for the SGTP and will be outlined within the Plans each year as applicable. The Enterprise Systems Upgrades primarily consists of the Distribution Management System (DMS) Consolidation projects as outlined in the 2016 SGTP. Applicable projects or initiatives are included in the 2017 SGTP Update, or will be included in future SGTPs as appropriate.

These strategic programs may be comprised of multiple gated projects and annually-funded work streams to accomplish the end state objectives. Each year, the Company funds and prioritizes the work efforts through the annual budgeting process, and the following governing bodies provide oversight of the portfolio: management teams, steering teams, and the financial management committee.

Cross-functional management teams aligned around the strategic programs provide program and project governance, gating and change request oversight. The management teams are also responsible for deployment performance, business readiness, issue resolution, and benefit tracking and reporting. Steering teams provide strategic oversight of all programs and projects to ensure alignment with enterprise, regulatory, financial, customer and operational strategies. Steering teams are responsible for portfolio performance, alignment with the grid improvement plan, cross-functional issue resolution (if escalated from the management teams) and to review and approve significant changes in the overall strategy. Finally, the financial management committee tracks the expenditures of the organizational budgets set forth by the Company. The committee also manages the reallocation of funding within the programs and projects to maintain budgetary compliance and determines available funding for emergent work, change requests, or any other item that has a financial impact to the organization.

The initial planning for the 10-year Grid Improvement Plan was completed in early 2017. Given this is a 10-year plan, the company will utilize a "progressive elaboration" process, pursuant to Project Management Institute best practices, to govern the plan throughout the lifecycle. In this process, the initial overall 10-year plan concepts are approved first, then a more detailed version of each year's plan is submitted and approved annually.

Stakeholder Outreach

Collaborative Initiatives

Through the North Carolina Public Benefits Funds, administered by Advanced Energy and Duke Energy, along with generous technical support from North Carolina's Electric Membership Cooperatives, Duke Energy and Dominion Energy North Carolina, there have been several smart grid stakeholder education initiatives.

As described in the 2016 Smart Grid Technology Plan, Advanced Energy's outreach efforts are being designed to help our state's residents make well-informed energy decisions. They want to share information about new technologies and services when they believe they can offer value, and they also want to share any concerns that may present risk. Highlights of the accomplishments over the past year include:

- Hosted a facilitated cross-sector planning meeting in November 2016 to identify priority audiences and energy related topics to focus educational and outreach efforts for 2017.

The key audiences identified by the stakeholders were: state legislators, utilities commissioners, county commissioners, municipal staff, public staff and large business customers.

- Identified a webinar series as the most efficient and flexible delivery method for the outreach and education body of work for the priority NC stakeholder audiences identified.
- The overarching goal of the webinar series was to build awareness among the targeted key decision makers on relevant smart grid topics and their effects on technology, economic development, and policy across North Carolina.

  2017 NC Smart Grid Webinar Series

  1. Smart Grid Basics (presented April 26, 2017)
  2. Solar Power and Grid Integration (presented May 24, 2017)
  3. Smart Meters and Advanced Metering Infrastructure (presented June 22, 2017)
  4. Microgrids and Grid Resiliency (presented September 20, 2017)
  5. Self-Optimizing Grid (scheduled October 24, 2017)
- Created a publicly accessible website, www.NCSmartGrid.org, hosted and maintained by Advanced Energy. This site contains a repository of smart grid resources, presentation collateral and video links that can be used by stakeholders state-wide. Recordings of the NC Smart Grid Webinar Series are available through the NC Smart Grid website as an ongoing resource for stakeholders.
- Future engagement activities include plans to convene a facilitated stakeholder session in November 2017, similar to that which took place in November 2016, to gather scoping input for 2018 education and outreach work.

2. Improving Reliability and Security of the Grid

Reference	Requirement
R8-60.1(c)(2)	*A description of how the proposed smart grid technology plan will improve reliability and security of the grid.*

The description for each new technology project listed under Sections 3 through 5, and the specific benefits described, outline the impacts each project will have on the reliability and security of the grid. Additionally, the grid improvement plan as a whole will provide synergies resulting in greater overall value in improving grid security, reliability and resiliency, while also creating greater efficiencies and improving safety and sustainability.

One of the primary objectives of the Power/Forward Carolinas grid improvement plan is to reduce outages. When outages do occur, the goal is to reduce the time customers are without power. There are additional objectives that will address the physical and cyber security of the grid through specific programs, and also as an ancillary result of other programs. While some of these programs may not fall into the definition of smart grid technologies, all are designed to play a vital role in modernizing the grid.

3. Current and Scheduled Technology Deployments

Reference	Requirement
R8-60.1(c)(3)	*For all smart grid technologies currently being deployed or scheduled for implementation within the next five years: (i) – (vii)*

DEC AMI Deployment

DEC submitted the May 5, 2017 Supplemental Information filing in Docket No. E-100, Sub 147 to the 2016 Smart Grid Technology Plans outlining its AMI deployment.

(i) A description of the technologies, including the goals and objectives of each technology, options for ensuring interoperability of the technology with the legacy system, and the expected life of the technology.

AMI is the foundational investment that will enable enhanced customer solutions - giving customers greater control, convenience and choice over their energy usage, while also giving customers the opportunity to budget, save time and save money. AMI technology allows a utility to gather more granular usage data and utilize new capabilities to offer new programs and services to customers that are not achievable through existing meters. The AMI technology will pave the way for programs that will allow customers to stay better informed during outages, control their due dates, avoid deposits, to be reconnected faster, and to better understand and take control of their energy usage, and ultimately, their bills. Over time, the Company also expects AMI meters to contribute to cost reductions from reduced truck rolls in the years after deployments.

Deployment of AMI meters allows customers to start, stop and move service without the need for a technician visit. The AMI meters also provide an interface for customers to see and understand their hourly energy usage, allowing them to better manage their consumption and, as a result, their bills. AMI meters will enable future customer programs such as outage notification alerts, mid-billing cycle usage alerts, a real-time usage application for smart phones, and the ability for customers to select their payment due date. The technology can also enable future energy efficiency options and potential time-of-use rate offerings as well as pre-payment programs. Current meters cannot provide these capabilities.

These new meters are directly interoperable with the existing AMI meter systems and have a planned life of approximately 15 years.

(ii) The status and timeframe for completion.

Through August 2017, DEC has installed a total of approximately 850,000 AMI meters in NC. Current plans for DEC NC installations total approximately 1.1 million additional meters through 2019.

(iii) A description of any existing equipment to be rendered obsolete by the new technology, its anticipated book value at time of retirement, alternative uses of the existing equipment, and the expected salvage value of the existing equipment.

DEC will be removing and replacing approximately 1.32 million AMR (Automated Meter Reading - "drive-by") meters over the three-year period beginning in 2017 and ending in 2019. The estimated salvage value of those meters is $1.37 M. The remaining net book value of the meters being removed is estimated at $127.66 M as of March 31, 2017.

(iv) A description of how the utility intends the technology to transfer information between it and the customer while maintaining the security of that information.

AMI meters capture energy usage and send it to grid routers directly, through range extenders, or through other meters to form a radio frequency (RF) mesh network. The grid routers transmit collected usage data to the AMI headend system via cellular backhaul once each day. The head-end system acts as the data collection point inbound from the metering infrastructure, as well as providing meter command and encryption key management outbound. The data is then sent to a Meter Data Management (MDM) system which provides billing determinants to the customer billing system for billing.

The data collected by the AMI meter utilizes a unique meter number (not displayed on the meter face) and thereby contains no personally identifiable customer information. All data is encrypted at the meter and decrypted at head-end system. The meter number is then used as the linkage to other information within the customer billing systems.

See additional information covered in Section 7(iv) and Appendix B related to how the utility provides usage information to customers through the secure online customer portal and billing statements.

(v) A description of how third parties will implement or utilize any portion of the technology, including transfers of customer-specific information from the utility to third parties, and how customers will authorize that information for release by the utility to third parties.

This section is not applicable as this project does not currently involve the transfer of customer information to any third-parties. Refer to Appendix B for general information on providing data to customers and third parties.

(vi) Approximate timing and amount of capital expenditures, including those already incurred.

DEC has incurred approximately $144.8 million in capital through August 2017 on the AMI deployment project covering both its North and South Carolina service territories. The

Company estimates an additional $41.8 million through year end 2017, and forecasts the following capital expenditures through the completion of the AMI deployment in 2019.

DEC AMI Capital Forecast	2016 Actuals	Actuals through Aug. 2017	Forecast for Sep. – Dec. 2017	2018 Forecast	2019 Forecast
Annual Capital $ (millions)	$54.5	$90.3	$41.8	$93.8	$11.6

(vii) Analyses relied upon by the utility for installations, including an explanation of the methodology and inputs used to perform the analyses.

The Cost-Benefit Analysis attached in Appendix C, Exhibit A is as presented to Company Management for consideration of the project. In evaluating the full scope of the AMI project, along with the approval of the DEC South Carolina portion of the AMI project, approval for the DEC North Carolina portion was not received until mid-November 2016. This Cost-Benefit Analysis represents total capital and operating expense deployment costs and operational benefits over a 20-year period, for the entire Duke Energy Carolinas service territory (North and South Carolina). The information presented in the high-level analysis in the 2016 SGTP was an estimated proportion of the total project costs and benefits allocated to North Carolina based on customer count. Many of the assumptions used for this analysis have now been either realized or discounted based on the detailed planning that has taken place since the final approval decision was made.

Based on updated plans for the DEC North Carolina AMI project, cost estimates for the remaining meter deployment project and necessary system scaling upgrades are estimated at approximately $260 million. Additionally, part of the Company's strategy moving forward has been aligned with providing customers with more choice, convenience and control. Therefore, the ability to offer the enhanced customer services and programs as detailed in section *R8-60.1 (c)(3)(i)* above, along with improvements in customer satisfaction, are some of the non-quantifiable benefits further supporting the Company's decision to move forward with a full AMI deployment.

For the cost-benefit analysis, see Appendix C, Exhibit A attached: **Duke Energy Carolinas Advanced Metering Infrastructure Cost Benefit Analysis**. For additional detail on the costs, see Exhibit B attached: **CONFIDENTIAL AMI Smart Meter Cost Inputs**. For additional detail on the benefits, see Exhibit C attached: **AMI Program Benefit Inputs and AMI Program Benefit Details**.

Self-Optimizing Grid

(i) A description of the technologies, including the goals and objectives of each technology, options for ensuring interoperability of the technology with the legacy system, and the expected life of the technology.

The Self-Optimizing Grid (SOG) Program implements additional design criteria on distribution circuits that improves reliability and enhances system resiliency. This resiliency will enable the system to reduce outage duration from fault events. Key components of the projects will involve adding capacity to distribution circuits and substation transformers and connecting radial distribution circuits together with automated switches. The head-end enterprise systems such as the Self-Healing software and the Distribution Management System (DMS) software are essential to enabling this capability.

The Self-Optimizing Grid is an advancement from Self-Healing "Networks". The Self-Healing Networks and Feeder Segmentation projects were a foundational step in the progression towards the SOG program. Instead of having individual circuit pairs that can back each other up, the integrated grid network allows for multiple circuit rerouting options to re-energize segments and minimize customer outage events. The SOG program will further segment the circuits to minimize the number of customers affected by sustained outages and ensures the necessary capacity and connectivity to fully leverage the segmentation.

Under this program, circuits will have automated switches deployed according to the SOG guidelines, which outline automated switches approximately every 400 customers, or 3 miles in circuit segment length, or 2 MW peak load. The goal of the SOG program is to have 80% of customers served from circuits that have alternate power re-routing options and sufficient capacity to re-route power without being overloaded the majority of the time. Circuits that meet these additional guidelines will have SOG capabilities.

The SOG will automatically reroute power around a problem area, like an outage caused by a tree falling across a line, animal interference, or fault events. With this automation, the grid can self-identify problems and isolate affected areas by reconfiguring the circuits, which can shorten or even eliminate outages for many customers.

Automated switch equipment typically has an approximate 20-year expected life, and control and communications equipment, an approximate 5- to 7-year expected life.

(ii) The status and timeframe for completion.

The initial engineering, scoping and planning for the SOG program began in 2017 with expectations to begin field work in 2018. The initial planning will address activities in 2018 and the planning for following years will occur as part of the annual planning process. 2018 is the first year of the expected 10-year program to achieve the anticipated goal of 80% of customers being served by the SOG.

(iii) A description of any existing equipment to be rendered obsolete by the new technology, its anticipated book value at time of retirement, alternative uses of the existing equipment, and the expected salvage value of the existing equipment.

During field work, installations will primarily consist of new equipment to achieve the new SOG guidelines. However, there will be instances where aged, automated switches, or other non-automated equipment will need to be replaced.

(iv) A description of how the utility intends the technology to transfer information between it and the customer while maintaining the security of that information.

This section is not applicable as this technology does not transfer information to/from customers.

(v) A description of how third parties will implement or utilize any portion of the technology, including transfers of customer-specific information from the utility to third parties, and how customers will authorize that information for release by the utility to third parties.

This section is not applicable as this technology does not transfer information to/from customers and will not be utilized by third-parties.

(vi) Approximate timing and amount of capital expenditures, including those already incurred.

Estimated costs through end of year 2017 are forecast to be approximately $1.45 M for planning, scope identification and engineering. Forecast capital expenditures for the next five years are as follows:

DEC (Millions)	2018	2019	2020	2021	2022
Self-Optimizing Grid	$103.8	$152.1	$153.0	$164.9	$164.6

(vii) Analyses relied upon by the utility for installations, including an explanation of the methodology and inputs used to perform the analyses.

Self-Optimizing Grid analysis uses the design criteria of segmenting the circuits for approximately 400 customers, 3 miles of circuit, or 2MW of load. Benefits can include:

- Reduces system-wide customers interrupted (CI) and customer minutes of interruption (CMI)
- Creates a networked energy system that improves operational situational awareness
- Minimizes the number of customers impacted by an outage
- Isolates problem areas for quicker mobilization and repair

- Shortens outage duration for impacted customers
- Automates system reconfigurations reducing the need for manual switching
- Improves grid resiliency and ability to recover from major events
- Enables the grid to effectively manage private distributed energy resources

Usage Alerts

(i) A description of the technologies, including the goals and objectives of each technology, options for ensuring interoperability of the technology with the legacy system, and the expected life of the technology.

The Usage Alerts program is designed to give customers increased transparency into their usage consumption. By leveraging smart meter data, this program will send customers an email at their mid-billing cycle indicating their actual usage to-date (showing kWh and dollars) and a projection of their end of cycle bill. This mid-cycle report also gives the customer increased choice and control by setting their preferences for receiving the data (email or text message) and setting their desired thresholds. Thresholds allow a customer to set their monthly spend target in dollars, and the usage alerts program will then communicate to a customer when they've reached 50%/75%/90%/100% of their set threshold amount. In these alerts, customers will also be able to see useful tips to allow them to be more efficient in their energy usage. The program is primarily designed for residential and small/medium business customers.

(ii) The status and timeframe for completion.

The Usage Alerts program was available to DEC customers with a smart meter in June 2017. As of early September 2017, the program has sent more than 602,000 messages to enrolled customers in DEC North Carolina. 95% of customers who responded to surveys have indicated their satisfaction with the program. The complete roll-out of the program is aligned with the deployment of AMI across the jurisdiction.

(iii) A description of any existing equipment to be rendered obsolete by the new technology, its anticipated book value at time of retirement, alternative uses of the existing equipment, and the expected salvage value of the existing equipment.

This section is not applicable.

(iv) A description of how the utility intends the technology to transfer information between it and the customer while maintaining the security of that information.

The Company works with a vendor partner to process usage alerts through text or email message based on customer preferences. Additionally, customers can update their method of receiving information through a preference center. The Company only transmits usage information as agreed to by the customer, displaying street number and street name only to correlate it to an account.

(v) A description of how third parties will implement or utilize any portion of the technology, including transfers of customer-specific information from the utility to third parties, and how customers will authorize that information for release by the utility to third parties.

This section is not applicable.

(vi) Approximate timing and amount of capital expenditures, including those already incurred.

This program incurred no capital expenditures.

(vii) Analyses relied upon by the utility for installations, including an explanation of the methodology and inputs used to perform the analyses.

JD Power customer survey results indicate that customers are more satisfied when they have more detail regarding their usage patterns, and when they are not surprised by their bill.

Pick Your Own Due Date

(i) A description of the technologies, including the goals and objectives of each technology, options for ensuring interoperability of the technology with the legacy system, and the expected life of the technology.

The Pick Your Own Due Date (PYDD) program is designed to allow customers to choose the due date for their monthly bill. Primarily designed for residential and small and medium business customers, the program leverages smart meter data to give customers the choice of choosing a due date without creating meter reading inefficiencies. The customer can choose any date of the month, and can update their selection one time each year. Smart meters are required for enabling this program because they provide daily data enabling billing to occur on the date preferred by the customer, rather than one based off a pre-determined meter reading route schedule.

(ii) The status and timeframe for completion.

The PYDD program was available for DEC customers with a smart meter in March 2017. The program has assisted almost 4,000 DEC-NC residential customers and 140 DEC-NC non-residential customers. The complete roll-out of the program is associated with the full deployment of AMI.

(iii) A description of any existing equipment to be rendered obsolete by the new technology, its anticipated book value at time of retirement, alternative uses of the existing equipment, and the expected salvage value of the existing equipment.

This section is not applicable.

(iv) A description of how the utility intends the technology to transfer information between it and the customer while maintaining the security of that information.

This section is not applicable.

(v) A description of how third parties will implement or utilize any portion of the technology, including transfers of customer-specific information from the utility to third parties, and how customers will authorize that information for release by the utility to third parties.

This section is not applicable.

(vi) Approximate timing and amount of capital expenditures, including those already incurred.

This program incurred no capital expenditures.

(vii) Analyses relied upon by the utility for installations, including an explanation of the methodology and inputs used to perform the analyses.

JD Power customer survey results consistently indicate that customers are more satisfied when they have the option to pick their own due date.

4. Technologies Actively Under Consideration

Reference	Requirement
R8-60.1 (c) 4	*For all smart grid technologies actively under consideration for implementation within the next five years, the smart grid technology plan shall include a description of the technologies, including the goals and objectives of the technologies, as well as a descriptive summary of any completed analysis used by the utility in assessing the smart grid technology.*

Enterprise Transmission Health & Risk Management Project

Duke Energy's Transmission Operations manages over 32,200 miles of transmission lines, nearly 10,000 transformers, and nearly 15,000 circuit breakers. As the result of modernization and record keeping over many years, the Company has access to a significant amount of data, and has begun accelerated strategies to employ data analytics to assess the health and risk of failure of the equipment. This method will optimize the utilization of these assets in order to better monitor the operational and financial health of the equipment fleet. However, in the current environment the evaluation of the fleet cannot be performed in a comprehensive manner. The Transmission Asset Management organization is using antiquated tools and manual methods to understand equipment health and to predict and react to equipment failures.

Transmission Health and Risk Management (HRM) is a philosophy for how to manage assets. This philosophy is supported by software, monitoring, data, analytics, data science and people. This project will implement a new enterprise Health & Risk Management (HRM) platform to collect and analyze data to prescribe how Transmission can improve the management of its assets. The Company's strategy identifies condition monitoring as a key strategic program and this work aligns with the Road Ahead strategy of modernizing the power grid.

The selected HRM solution is an advanced analytics software package that helps utilities use a systematic, data-driven approach to assess the on-going health of assets, and take specific actions to improve overall system reliability. This enterprise project is estimated at approximately $40 million and expected to be implemented over a four-year period, beginning by the end of 2017.

The HRM solution enables personnel to better manage Transmission transformer and breaker health, and capture significant value by:

- Reducing operating expenses by prioritizing replacement and maintenance actions
- Improving capital expense efficiency by prioritizing replacement and maintenance actions
- Improving customer value though improved reliability
- Reducing the likelihood of catastrophic transformer failures

HRM Project Objectives

- Implement a new Health and Risk Management platform
- Develop new HRM processes
- Become proactive versus reactive by shifting from an alarming model to a predictive model that incorporates the component, asset, fleet, and system health & risk data
- Extend the lifecycle of aging assets
- Reduce asset failures or catastrophic failures

Enterprise Communications Network Upgrades Program

Strategic Fiber and Wireless Transport

The backbone of Duke Energy's communications network (a.k.a. the 3rd Grid) is the transport network, which consists of fiber optical cable and microwave systems. A recent current state assessment identified 1,750 miles of fiber optic cable that needs to be evaluated for replacement (based on age) and several key fiber rings that are underperforming. Additionally, to satisfy business needs identified during the Enterprise Communications Strategy effort, Duke Energy will expand its fiber network to connect key generating plants, operations centers, substations and other critical facilities. Microwave systems are also used to provide high capacity connectivity. Many of Duke Energy's microwave systems in place today use network technology that is becoming obsolete, and the capacity of many microwave paths is not meeting business needs.

The Strategic Fiber and Wireless Transport work stream will begin replacing end-of-life fiber optic cable and microwave systems, add fiber to new, targeted routes based on business needs, and investigate alternatives to optical ground wire to enable Duke Energy to deploy fiber faster and less costly. The Enterprise Communications strategy concluded that to move to a smarter grid, the Company needed to:

- Treat communications as the 3rd Grid (e.g., an enterprise asset) and elevate communications to the same status as the electric grid and the gas grid
- Implement Broadband Internet Protocol from the core to the edge of the grid
- Make communications grid improvements that ensure: resiliency, reliability, security, capacity, and low latency. Fiber is one of the primary ways to enhance the entire communications grid.
- Expand network infrastructure, uplifting end-of-life technology and implementing a holistic network design

Grid Wide Area Network (WAN)

The Grid WAN initiative includes efforts to replace end-of-life data network hardware on the network core and in substations, and to convert substation hardware to Internet Protocol (IP). This work stream also includes redesigning existing networks for more capacity and better resiliency, and developing strategies for the Field Area Network (FAN) and Neighborhood Area Network (NAN).

A FAN strategy is being developed to support changes to grid communications due to the emergence of solar and battery storage, microgrids and distributed intelligence. A NAN strategy will also help to optimize the value of the AMI infrastructure by enabling other use cases such as lighting controls and demand response to benefit from its two-way mesh communications, in addition to scaling it for enterprise-wide AMI.

Next Generation Cellular

Duke Energy primarily uses a cellular vendor for cellular connections to substations, distribution line devices, AMI backhaul devices, direct-connect meters and load management switches. A significant number of these modems use 2G/3G technology which will be decommissioned by the cellular vendor by the end of 2022. Therefore, the Company will need to replace its 2G/3G cellular modems by the end of 2022. Some of these modems may be replaced by other efforts, such as the enterprise roll-out of AMI and the replacement of end-of-life substation routers; however, any remaining modems will be replaced as part of this work stream.

5. Technology Pilots and Initiatives

Reference	Requirement
R8-60.1 (c) 5	*For each pilot project or initiative currently underway or planned within the next two years to evaluate smart grid technologies: (i) – (v)*

At this time, the Company does not have any new pilot projects or initiatives to evaluate smart grid technologies.

6. Projects No Longer Being Considered

Reference	Requirement
R8-60.1 (c) 6	*A description of each project or initiative described in a previous plan that is no longer under consideration by the utility, and the basis for the decision to end consideration of each project or initiative.*

At this time, the Company does not have any projects or initiatives that are no longer under consideration.

7. Advanced Metering Infrastructure (AMI) Summary

Reference	Requirement
R8-60.1 (c) 7	*For automated metering infrastructure (AMI), in addition to the information required in subsections (3) or (4) of this section, as appropriate, the utility shall also provide: (i) – (iv)*

(i) A table indicating the extent to which AMI meters have been installed in the utility's service territory and specifically in North Carolina, the North Carolina jurisdictional customer classes and/or tariffs of customers with AMI, and the predicted lifespans of these installations. This table should indicate the number of AMI meters that has been installed both cumulatively and since the filing of the last smart grid technology plan.
(ii) The number of meters in North Carolina that use traditional metering technology and/or automated meter reading (AMR) technology, and the predicted lifespans for these installations.

Meters installed in DEC North Carolina as of August 2017

Customer Class	AMI Meters	AMR Meters	Walk-By & Other Meters
NC Residential	680,173	1,045,641	3,149
NC Commercial	154,451	116,790	5,819
NC Industrial	7,422	1,122	1,659
NC Company Use & Other	3,742	7,493	30
Totals	**845,788**	**1,171,046**	**10,657**

DEC has installed approximately 318,397 AMI meters in NC since the information provided in the 2016 Smart Grid Technology Plan. The predicted lifespan of the AMI meters is approximately 15 years, and all other meters currently installed have a 15-20 year lifespan.

(iii) Any adjustment made by the utility to its capital accounting due to AMI, including the dollar amount of write-downs of its meter inventories.

In DEC North Carolina, the remaining book value of meters being retired through the AMI deployment is being deferred in a deferred debit account pending Commission approval in Docket No. E-7, Sub 1146 for the Company's request to include the amount for retired meters in a regulatory asset.

(iv) A discussion of what AMI services or functions are currently being utilized, as well as any plans for implementing other AMI services or functions within the next two years.

There are no significant revisions to the AMI services or functions utilized or planned by DEC since the 2016 SGTP.

Appendix A – Proposed Changes to Data Access Rules

Pursuant to the North Carolina Utilities Commission's March 29, 2017 *Order Accepting Smart Grid Technology Plans* (March 29, 2017 SGTP Order) in Docket No. E-100, Sub 147, requesting that the electric utilities, the Public Staff, and all interested parties continue discussing potential rule changes related to customer data access, and that Duke include a report on those discussions in its 2017 SGTPs, DEC and DEP provide the following report:

Since the issuance of the Commission's March 29, 2017 SGTP Order, DEC and DEP have not had any formal discussions with NCSEA and the Public Staff regarding potential rule changes to address data access issues. During 2017, DEC and DEP had some discussions related to data access issues with NCSEA and the Public Staff in the context of a legislative stakeholder process, but no such legislation was ultimately enacted. The Companies remain willing to have further discussions should the Commission decide to engage in such rulemaking.

Appendix B – Responses to Questions in Commission's August 23, 2013 Order in Docket No. E-100, Sub 137

Pursuant to the North Carolina Utilities Commission's March 29, 2017 *Order Accepting Smart Grid Technology Plans* in Docket No. E-100, Sub 147, that DEC and DEP "update their responses to the questions posed in the Commission's August 23, 2013 Order and include those responses in future SGTP filings." Duke Energy Carolinas provides the following response.

The Company has had no significant revisions to the responses provided in the 2016 Smart Grid Technology Plan, Appendix B.

Appendix C – DEC AMI Analysis Files

Exhibit A

Duke Energy Carolinas Advanced Metering Infrastructure Cost Benefit Analysis

		AMI Program Costs ($000s)				AMI Program Benefits ($000s)											Net Present Value		
		Total Capital Program Costs	Total Capital Recurring Costs	Total O&M Program Costs	Total O&M Recurring costs	Reduced meter reading costs	Reduced meter operations costs - consumer order workers for meter orders	Reduced meter operations costs - field metering labor	Reduced meter operations costs - testing, repairs, reading equipment	Reduced restoration costs - OK on arrival	Reduced restoration costs - major storms	Misc O&M savings	Reduced equipment failures	Misc capital savings	AMR meter salvage value	Non-technical line loss reduction - power theft, equipment failures and installation errors	**Net Benefits and (Costs)**	Loss on Net Book Value of AMR Meters	Net Benefits & (Costs)
1	2016	- 45,137	-	- 350	- 253	492	-	1,333	-	-	-	-	-	-	257	-	**- 43,658**	- 85,050	- 128,708
2	2017	- 151,520	- 443	- 2,750	- 1,364	792	2,004	3,232	-	122	291	436	571	145	580	9,034	**- 138,871**	-	- 138,871
3	2018	- 154,483	- 796	- 3,250	- 2,588	1,440	4,815	3,242	-	293	698	1,047	1,371	349	533	21,172	**- 126,158**	-	- 126,158
4	2019	- 34,911	- 886	-	- 2,873	2,250	7,800	3,242	-	475	1,130	1,696	2,221	565	1	33,470	**14,180**	-	14,180
5	2020	-	- 1,839	-	- 4,062	2,470	8,034	-	-	489	1,164	1,747	2,288	582	-	38,530	**49,404**	-	49,404
6	2021	-	- 1,840	-	- 4,170	2,542	9,479	-	-	577	1,374	2,061	2,700	687	-	38,723	**52,132**	-	52,132
7	2022	-	- 2,100	-	- 4,280	2,617	9,764	-	-	594	1,415	2,123	2,781	708	-	38,917	**52,537**	-	52,537
8	2023	-	- 2,101	-	- 4,392	2,694	10,056	-	-	612	1,457	2,186	2,864	729	-	39,111	**53,217**	-	53,217
9	2024	-	- 2,102	-	- 4,506	2,773	10,358	-	-	630	1,501	2,252	2,950	751	-	39,307	**53,915**	-	53,915
10	2025	-	- 2,103	-	- 4,621	2,855	10,669	-	-	649	1,546	2,319	3,038	773	-	39,503	**54,630**	-	54,630
11	2026	-	- 15,159	-	- 4,738	2,939	10,989	-	-	669	1,593	2,389	3,130	796	-	39,701	**42,308**	-	42,308
12	2027	-	- 1,846	-	- 4,857	3,026	11,319	-	-	689	1,640	2,461	3,223	820	-	39,899	**56,375**	-	56,375
13	2028	-	- 1,846	-	- 4,978	3,115	11,658	-	-	710	1,690	2,534	3,320	845	-	40,099	**57,147**	-	57,147
14	2029	-	- 1,847	-	- 5,100	3,207	12,008	-	-	731	1,740	2,610	3,420	870	-	40,299	**57,938**	-	57,938
15	2030	-	- 1,848	-	- 5,225	3,302	12,368	-	-	753	1,792	2,689	3,522	896	-	40,501	**58,750**	-	58,750
16	2031	-	- 1,849	-	- 5,352	3,399	12,739	-	-	775	1,846	2,769	3,628	923	-	40,703	**59,583**	-	59,583
17	2032	-	- 1,850	-	- 5,481	3,499	13,121	-	-	799	1,902	2,852	3,737	951	-	40,907	**60,437**	-	60,437
18	2033	-	- 1,851	-	- 5,612	2,745	10,299	-	-	627	1,493	2,239	2,933	746	-	31,327	**44,945**	-	44,945
19	2034	-	- 1,852	-	- 5,746	1,651	6,195	-	-	377	898	1,347	1,764	449	-	18,386	**23,468**	-	23,468
20	2035	-	- 1,853	-	- 5,882	485	1,821	-	-	111	264	396	519	132	-	5,273	**1,266**	-	1,266
		- 386,051	- 46,011	- 6,350	- 86,079	48,292	175,497	11,049	-	10,682	25,434	38,152	49,980	12,717	1,370	634,864	**483,547**	**- 85,050**	**398,497**

	Net Benefits and (Costs)	Net Benefits & (Costs)
Net Present Value of Benefits & Costs	**117,171**	**37,482**
Duke Energy Carolinas Weighted Average Cost of Capital	6.7%	
Internal Rate of Return	11.7%	8.0%

Early Retirement of AMR Meters	
Net Book Value of AMR Meters	- 135,000
Loss on Early Retirement of AMR Meters	- 85,050

Exhibit B REDACTED Appendix C

DUKE ENERGY — AMI / Smart Meter — Cost Inputs - By Program and Initiative — Forward — Home

Capital - Program Costs Initial Capital

Asset	Technology	Initiative	Cost Type	Cost Subtype	Description	Total Cost	Year 1 2016	Year 2 2017	Year 3 2018	Year 4 2019	Year 5 2020	Year 6 2021	Year 7 2022	Year 8 2023	Year 9 2024	Year 10 2025	Year 11 2026	Year 12 2027	Year 13 2028	Year 14 2029	Year 15 2030	Year 16 2031	Year 17 2032	Year 18 2033	Year 19 2034	Year 20 2035	Total
Customer Assets	AMI/Smart Meter	AMI Smart Meter	Field Technology	Equipment	Costs of Comm. Devices	[redacted]																					
Customer Assets	AMI/Smart Meter	AMI Smart Meter	Field Technology	Equipment	Costs Meters	[redacted]																					
Customer Assets	AMI/Smart Meter	AMI Smart Meter	Field Technology	Equipment	Stores Loading & Tax	[redacted]																					
Customer Assets	AMI/Smart Meter	AMI Smart Meter	Field Technology	Equipment	Miscellaneous (Optimization Equipment)	[redacted]																					
Customer Assets	AMI/Smart Meter	AMI Smart Meter	Field Technology	Contractor Labor	Installation Cost & Vendor Services	[redacted]																					
Customer Assets	AMI/Smart Meter	AMI Smart Meter	Field Technology	Internal Labor	Contingency (Estimated Uncertainty)	16,248,576	1,748,410	6,462,698	6,476,099	1,561,369	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16,248,576
Customer Assets	AMI/Smart Meter	AMI Smart Meter	Field Technology	Internal Labor	Contingency (Risk)	5,096,413	548,394	2,027,044	2,031,247	489,728	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5,096,413
Customer Assets	AMI/Smart Meter	AMI Smart Meter	Field Technology	Internal Labor	Network Optimization Costs	14,255,389	488,702	4,565,268	5,033,303	4,168,116	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14,255,389
Customer Assets	AMI/Smart Meter	AMI Smart Meter	Eng. & Other Services	Internal Labor	Other Labor (Billing, Telecom, Escalation, Expenses)	7,762,662	364,330	2,265,040	3,086,710	2,046,582	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7,762,662
Customer Assets	AMI/Smart Meter	AMI Smart Meter	Eng. & Other Services	Internal Labor	PMO Allocations	3,308,559	356,014	1,315,944	1,318,673	317,928	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3,308,559
Customer Assets	AMI/Smart Meter	AMI Smart Meter	Eng. & Other Services	Internal Labor	Duke PM Costs	10,543,894	1,759,693	3,040,528	3,044,845	2,698,828	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10,543,894
Customer Assets	AMI/Smart Meter	AMI Smart Meter	Back Office Systems	IT - Hardware	MDM Enterprise Allocation to DEC	21,000,000	1,000,000	10,000,000	10,000,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	21,000,000
Customer Assets	AMI/Smart Meter	AMI Smart Meter	Back Office Systems	IT - Hardware	OW Enterprise Allocation to DEC	2,112,500		1,112,500	1,000,000																		2,112,500
Customer Assets	AMI/Smart Meter	AMI Smart Meter	Back Office Systems	IT- Software	Advance Bridge Enablement	1,650,000	400,000	1,250,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,650,000
Customer Assets	AMI/Smart Meter	AMI Smart Meter	Back Office Systems	IT- Software	Large C&I to AMI Conversion	6,000,000	-	2,000,000	4,000,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6,000,000
						386,050,891	45,136,562	151,520,470	154,483,272	34,910,587	-																386,050,891

O&M - Program Costs Non Recurring O&M

Asset	Technology	Initiative	Cost Type	Cost Subtype	Description	Total Cost	Year 1 2016	Year 2 2017	Year 3 2018	Year 4 2019	Year 5 2020	Year 6 2021	Year 7 2022	Year 8 2023	Year 9 2024	Year 10 2025	Year 11 2026	Year 12 2027	Year 13 2028	Year 14 2029	Year 15 2030	Year 16 2031	Year 17 2032	Year 18 2033	Year 19 2034	Year 20 2035	Total
Customer Assets	AMI/Smart Meter	AMI Smart Meter	Back Office Systems	IT - Hardware	MDM Enterprise Allocation to DEC	1,000,000	-	500,000	500,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,000,000
Customer Assets	AMI/Smart Meter	AMI Smart Meter	Field Technology	Equipment	OW Enterprise Allocation to DEC	[redacted]																					
Customer Assets	AMI/Smart Meter	AMI Smart Meter	Back Office Systems	IT- Software	Advance Bridge Enablement	850,000	350,000	500,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	850,000
Customer Assets	AMI/Smart Meter	AMI Smart Meter	Back Office Systems	IT- Software	Large C&I to AMI Conversion	4,000,000	-	1,500,000	2,500,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4,000,000
						6,350,000	350,000	2,750,000	3,250,000	-	-																6,350,000

Capital - Recurring Costs

Asset	Technology	Initiative	Cost Type	Cost Subtype	Description	Total Cost	Year 1 2016	Year 2 2017	Year 3 2018	Year 4 2019	Year 5 2020	Year 6 2021	Year 7 2022	Year 8 2023	Year 9 2024	Year 10 2025	Year 11 2026	Year 12 2027	Year 13 2028	Year 14 2029	Year 15 2030	Year 16 2031	Year 17 2032	Year 18 2033	Year 19 2034	Year 20 2035	Total
Customer Assets	AMI/Smart Meter	AMI/ Smart Meter	Field Technology	Equipment	Comm. Device End of Life Replacement Costs (incl. stores loading)	[redacted]																					
Customer Assets	AMI/Smart Meter	AMI/ Smart Meter	Field Technology	Equipment	Annual Costs assoc. with Comm Failures	[redacted]																					
Customer Assets	AMI/Smart Meter	AMI/ Smart Meter	Field Technology	Equipment	Annual Costs assoc. with Meter Failures/Growth	[redacted]																					
Customer Assets	AMI/Smart Meter					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Customer Assets	AMI/Smart Meter					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
						46,011,217	-	442,853	796,129	886,428	1,839,234	1,840,132	2,099,964	2,100,862	2,101,760	2,102,658	15,159,189	1,845,520	1,846,418	1,847,316	1,848,214	1,849,112	1,850,010	1,850,908	1,851,806	1,852,704	46,011,217

O&M - Recurring Costs

Asset	Technology	Initiative	Cost Type	Cost Subtype	Description	Total Cost	Year 1 2016	Year 2 2017	Year 3 2018	Year 4 2019	Year 5 2020	Year 6 2021	Year 7 2022	Year 8 2023	Year 9 2024	Year 10 2025	Year 11 2026	Year 12 2027	Year 13 2028	Year 14 2029	Year 15 2030	Year 16 2031	Year 17 2032	Year 18 2033	Year 19 2034	Year 20 2035	Total
Customer Assets	AMI/Smart Meter	AMI/ Smart Meter	Field Technology	Equipment	Vendor Annual Maintenance Costs (maintenance for comm. equip.)	[redacted]																					
Customer Assets	AMI/Smart Meter	AMI/ Smart Meter	Eng. & Other Services	Internal Labor	Duke Operational Labor (Telecom)	1,790,464	-	-	-	-	93,184	95,680	98,176	100,672	103,168	105,664	108,160	110,656	113,152	115,648	118,144	120,640	123,136	125,632	128,128	130,624	1,790,464
Customer Assets	AMI/Smart Meter	AMI/ Smart Meter	Eng. & Other Services	Internal Labor	Duke Operational Labor (HE System Op Costs)	4,899,737	-	-	-	-	255,005	261,835	268,666	275,496	282,327	289,157	295,988	302,818	309,649	316,479	323,310	330,140	336,971	343,801	350,632	357,462	4,899,737
Customer Assets	AMI/Smart Meter	AMI/ Smart Meter	Field Technology	Other O&M	WAN Costs	18,821,882	-	333,057	670,977	845,249	870,606	895,964	921,321	946,679	972,036	997,394	1,022,751	1,048,109	1,073,466	1,098,824	1,124,181	1,149,539	1,174,896	1,200,254	1,225,611	1,250,968	18,821,882
Customer Assets	AMI/Smart Meter	AMI/ Smart Meter	Eng. & Other Services	Other O&M	Billing team labor to manage interval reads	8,166,228	-	-	-	-	425,008	436,392	447,776	459,161	470,545	481,929	493,313	504,697	516,081	527,465	538,850	550,234	561,618	573,002	584,386	595,770	8,166,228
Customer Assets	AMI/Smart Meter	AMI/ Smart Meter	Eng. & Other Services	Other O&M	Analytics labor to support revenue protection	6,494,488	-	-	-	-	338,003	347,057	356,110	365,164	374,218	383,271	392,325	401,379	410,432	419,486	428,540	437,593	446,647	455,701	464,754	473,808	6,494,488
Customer Assets	AMI/Smart Meter					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Customer Assets	AMI/Smart Meter					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
						86,079,489	252,849	1,363,805	2,587,761	2,873,354	4,061,755	4,170,275	4,280,397	4,392,169	4,505,641	4,620,863	4,737,888	4,856,771	4,977,566	5,100,331	5,225,126	5,352,010	5,481,048	5,612,303	5,745,842	5,881,734	86,079,489

Total Cost

Total Cost	Year 1 2016	Year 2 2017	Year 3 2018	Year 4 2019	Year 5 2020	Year 6 2021	Year 7 2022	Year 8 2023	Year 9 2024	Year 10 2025	Year 11 2026	Year 12 2027	Year 13 2028	Year 14 2029	Year 15 2030	Year 16 2031	Year 17 2032	Year 18 2033	Year 19 2034	Year 20 2035	Total
Total Capital Program Costs	45,136,562	151,520,470	154,483,272	34,910,587	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	386,050,891
Total Capital Recurring Costs	-	442,853	796,129	886,428	1,839,234	1,840,132	2,099,964	2,100,862	2,101,760	2,102,658	15,159,189	1,845,520	1,846,418	1,847,316	1,848,214	1,849,112	1,850,010	1,850,908	1,851,806	1,852,704	46,011,217
Total O&M Program Costs	350,000	2,750,000	3,250,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6,350,000
Total O&M Recurring costs	252,849	1,363,805	2,587,761	2,873,354	4,061,755	4,170,275	4,280,397	4,392,169	4,505,641	4,620,863	4,737,888	4,856,771	4,977,566	5,100,331	5,225,126	5,352,010	5,481,048	5,612,303	5,745,842	5,881,734	86,079,489
Total Capital	$45,136,562	$151,963,323	$155,279,401	$35,797,015	$1,839,234	$1,840,132	$2,099,964	$2,100,862	$2,101,760	$2,102,658	$15,159,189	$1,845,520	$1,846,418	$1,847,316	$1,848,214	$1,849,112	$1,850,010	$1,850,908	$1,851,806	$1,852,704	$432,062,108
Total O&M	$602,849	$4,113,805	$5,837,761	$2,873,354	$4,061,755	$4,170,275	$4,280,397	$4,392,169	$4,505,641	$4,620,863	$4,737,888	$4,856,771	$4,977,566	$5,100,331	$5,225,126	$5,352,010	$5,481,048	$5,612,303	$5,745,842	$5,881,734	$92,429,489
Total Annual Costs	$45,739,411	$156,077,128	$161,117,162	$38,670,369	$5,900,989	$6,010,407	$6,380,361	$6,493,031	$6,607,401	$6,723,521	$19,897,077	$6,702,291	$6,823,984	$6,947,647	$7,073,340	$7,201,122	$7,331,058	$7,463,211	$7,597,648	$7,734,438	$524,491,597

Project Deployment and On-going Capital Costs

Project Deployment Capital Costs	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	0
Field Technology	41,256,525	130,536,458	132,033,044	29,847,249	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	333,673,276
Communications	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Eng. & Other Services	2,480,037	6,621,512	7,450,228	5,063,338	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	21,615,115
Back Office Systems	1,400,000	14,362,500	15,000,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	30,762,500
Indirect	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	$45,136,562	$151,520,470	$154,483,272	$34,910,587	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$386,050,891

Project On-going Capital Costs	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	0
Field Technology	-	442,853	796,129	886,428	1,839,234	1,840,132	2,099,964	2,100,862	2,101,760	2,102,658	15,159,189	1,845,520	1,846,418	1,847,316	1,848,214	1,849,112	1,850,010	1,850,908	1,851,806	1,852,704	46,011,217
Communications	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Eng. & Other Services	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Back Office Systems	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	$0	$442,853	$796,129	$886,428	$1,839,234	$1,840,132	$2,099,964	$2,100,862	$2,101,760	$2,102,658	$15,159,189	$1,845,520	$1,846,418	$1,847,316	$1,848,214	$1,849,112	$1,850,010	$1,850,908	$1,851,806	$1,852,704	$46,011,217

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AMI Program Benefit Inputs

Annual Benefits ($)					Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	
Asset	**Technology**	**Initiative**	**Benefit Name**	**Duke Benefit Description**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**Total 20 Year**
Customer Assets	AMI/Smart Meter	AMI Deployment	Reduced Meter Reading Cost	***Reduced meter reading costs***	$ 491,592	$ 792,356	$ 1,439,895	$ 2,249,849	$ 2,469,678	$ 2,542,238	$ 2,616,976	$ 2,693,955	$ 2,773,244	$ 2,854,911	$ 2,939,028	$ 3,025,669	$ 3,114,909	$ 3,206,826	$ 3,301,501	$ 3,399,016	$ 3,499,457	$ 2,745,418	$ 1,650,713	$ 485,041	$ 48,292,272
Customer Assets	AMI/Smart Meter	AMI Deployment	Reduced T&D Operations Cost	***Reduced meter operations costs - consumer order workers for meter orders***	$ -	$ 2,004,474	$ 4,814,527	$ 7,800,315	$ 8,034,324	$ 9,479,214	$ 9,763,591	$ 10,056,498	$ 10,358,193	$ 10,668,939	$ 10,989,007	$ 11,318,678	$ 11,658,238	$ 12,007,985	$ 12,368,225	$ 12,739,271	$ 13,121,450	$ 10,298,501	$ 6,194,643	$ 1,820,947	$ 175,497,020
Customer Assets	AMI/Smart Meter	AMI Deployment	Reduced T&D Operations Cost	***Reduced meter operations costs - field metering labor***	$ 1,333,183	$ 3,231,635	$ 3,242,300	$ 3,242,300	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,049,418
Customer Assets	AMI/Smart Meter	AMI Deployment	Reduced Restoration Cost	***Reduced restoration costs - OK on arrival***	$ -	$ 122,011	$ 293,058	$ 474,802	$ 489,046	$ 576,996	$ 594,306	$ 612,135	$ 630,499	$ 649,414	$ 668,896	$ 688,963	$ 709,632	$ 730,921	$ 752,848	$ 775,434	$ 798,697	$ 626,865	$ 377,065	$ 110,840	$ 10,682,427
Customer Assets	AMI/Smart Meter	AMI Deployment	Reduced Restoration Cost	***Reduced restoration costs - major storms***	$ -	$ 290,503	$ 697,758	$ 1,130,480	$ 1,164,395	$ 1,373,799	$ 1,415,013	$ 1,457,464	$ 1,501,187	$ 1,546,223	$ 1,592,610	$ 1,640,388	$ 1,689,600	$ 1,740,288	$ 1,792,496	$ 1,846,271	$ 1,901,659	$ 1,492,536	$ 897,774	$ 263,905	$ 25,434,351
Customer Assets	AMI/Smart Meter	AMI Deployment	Reduced Equipment Failures	***Miscellaneous O&M savings***	$ -	$ 435,755	$ 1,046,636	$ 1,695,721	$ 1,746,592	$ 2,060,699	$ 2,122,520	$ 2,186,195	$ 2,251,781	$ 2,319,335	$ 2,388,915	$ 2,460,582	$ 2,534,400	$ 2,610,432	$ 2,688,744	$ 2,769,407	$ 2,852,489	$ 2,238,805	$ 1,346,661	$ 395,858	$ 38,151,526
Customer Assets	AMI/Smart Meter	AMI Deployment	Avoided Equipment and Maintenance Costs	***Reduced equipment failures***	$ -	$ 570,861	$ 1,371,146	$ 2,221,478	$ 2,288,122	$ 2,699,618	$ 2,780,606	$ 2,864,024	$ 2,949,945	$ 3,038,443	$ 3,129,597	$ 3,223,485	$ 3,320,189	$ 3,419,795	$ 3,522,389	$ 3,628,060	$ 3,736,902	$ 2,932,945	$ 1,764,193	$ 518,594	$ 49,980,391
Customer Assets	AMI/Smart Meter	AMI Deployment	Avoided Equipment and Maintenance Costs	***Miscellaneous capital savings***	$ -	$ 145,252	$ 348,879	$ 565,240	$ 582,197	$ 686,900	$ 707,507	$ 728,732	$ 750,594	$ 773,112	$ 796,305	$ 820,194	$ 844,800	$ 870,144	$ 896,248	$ 923,136	$ 950,830	$ 746,268	$ 448,887	$ 131,953	$ 12,717,175
Customer Assets	AMI/Smart Meter	AMI Deployment	Increased Revenue	***AMR meter salvage value***	$ 256,550	$ 579,600	$ 533,050	$ 711	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,369,911
Customer Assets	AMI/Smart Meter	AMI Deployment	Increased Revenue	***Non-technical line loss reduction - power theft, equipment failures and installation errors***	$ -	$ 9,034,054	$ 21,172,140	$ 33,469,720	$ 38,530,433	$ 38,723,086	$ 38,916,701	$ 39,111,284	$ 39,306,841	$ 39,503,375	$ 39,700,892	$ 39,899,396	$ 40,098,893	$ 40,299,388	$ 40,500,885	$ 40,703,389	$ 40,906,906	$ 31,326,918	$ 18,386,064	$ 5,273,495	$ 634,863,861
																									$ -
					$ 2,081,325	$ 17,206,500	$ 34,959,389	$ 52,850,616	$ 55,304,789	$ 58,142,549	$ 58,917,218	$ 59,710,287	$ 60,522,284	$ 61,353,751	$ 62,205,250	$ 63,077,355	$ 63,970,660	$ 64,885,778	$ 65,823,337	$ 66,783,985	$ 67,768,389	$ 52,408,256	$ 31,066,002	$ 9,000,632	$ 1,008,038,352

AMI Program Benefit Details

	Benefit	Benefit Type	Description	Input	Total Savings (20 Years)
1	Eliminate regular meter reads	Expense Reduction	Reduced Meter Reading needs. Benefit derived from current budget, however Metering expects costs/meter for existing contract service to increase by 25% as volume decreases. Decrease budget amount to $20M.		$ 48,292,272
2	Reduce off-cycle meter reads and field disconnects/reconnects (COW)	Expense Reduction	Reduced consumer order field visits for Disconnect/Reconnect and Succession reads as these tasks are automated. Reviewed with Fred Logan, Michael Volrich, financial folks. Does not factor in new non-AMI work or final 'geographical coverage' practicality review.	Utilize 9/15 previous 12 months costs for the following items • 42% of Cred On/DNP expenses and 100% of OT expense • 90% of Connect/Disconnect expenses • 90% of Succession read expenses	$ 175,497,020
3	Meter Operations Savings	Expense Reduction	Reduced meter operations costs - field metering labor		$ 11,049,418
4	Outage – reduce "OK on arrival"	Avoided Costs - O&M	Reduced truck rolls required to verify voltage to meter due to ability to remotely verify. Not currently vetted with business to actually reduce outage assessment budget	Utilize four year monthly average from DOMS of "Ok on arrival" trouble orders related to single calls and mid-level storms, calculation assumed 80% reduced and ¾ hour time	$ 10,682,427
5	Outage – reduce major storm restoration	Avoided Costs - O&M	Reduced truck rolls required to verify voltage to meter due to ability to remotely verify. Not currently vetted with business to actually reduce outage assessment budget	Utilize three year average of major storm related labor (internal and contract) to determine daily average for major storm restoration. Reduction = ½ day	$ 25,434,351
6	Miscellaneous O&M costs	Avoided Costs - O&M	Basis - Estimate	Includes nominal amounts to represent other enabling benefits such as : • Improve vegetation management (voltage sag data from meters) • Reduced customer calls • Reduced estimated bills	$ 38,151,526
7	Legacy meter failures	Avoided Costs - Capital	Full cost of new meter failures captured in project costs. This is full benefit of reduced meter faiures (old meters vs. new AMI meters).	Utilize internal annual failure rate of 1.83% and meter costs of $61.62 ($29.62 for material and $32 for installation)	$ 49,980,391
8	Miscellaneous capital costs	Avoided Costs - Capital	Basis - estimate	Includes nominal amounts to represent other enabling benefits such as: • Improve asset management (aggregate meter data to identify over/under loaded distribution transformers, and stress points in the grid) • Leverage meter Volt/Var data to improve placement of capacitor banks	$ 12,717,175
9	Reduce non-technical distribution losses	Increased Revenue	Assume this includes all revenue capture – including registration erosion, mis-wiring, etc.. Calculated at 2% of gross Res/Comm revenue, 80% enabled by AMI, 60% billable/recoverable	EPRI Study - December 2008 - "AMI Technology: Limiting Non-Technical Distribution Losses in the Future" • Non-performing/under-performing meters • Incorrect application of multiplying factors • Defects in CT & PT circuitry • Non-reading of meters • Pilferage by manipulating or bypassing of meters • Theft by direct tapping	$ 634,863,861

Duke Energy Progress

2017 Smart Grid Technology Plan Update

DUKE ENERGY PROGRESS

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Overview

As required by the North Carolina Utilities Commission (NCUC or Commission) Rule R8-60.1(b), Duke Energy Progress (DEP or Company) submits its 2017 Smart Grid Technology Plan Update (SGTP Update). The 2017 SGTP Update represents the significant amendments or revisions to the 2016 Smart Grid Technology Plan.

1. Smart Grid Technology Strategy

Reference	Requirement
R8-60.1(c)(1)	*A summary of the utility's strategy for evaluating and developing smart grid technologies.*

Power/Forward Carolinas Grid Improvement Plan

Announced in 2017, the Company outlined its plans over the next decade to modernize the North Carolina grid. Power/Forward Carolinas is comprised of strategic programs that will each play a part in building a smarter energy future for customers. These strategic programs represent the means to deliver the Road Ahead strategies of modernizing the power grid and transforming the customer experience, as outlined in the 2016 SGTP. The early years of Power/Forward Carolinas will establish the foundational and enabling infrastructure and technologies to achieve the Company's long-term objectives of a more reliable, resilient grid to better serve customers.

Certain programs included in the Power/Forward Carolinas initiative are technologies that fall under the definition of "smart grid technologies" outlined in Commission Rule R8-60.1(c), while others are not. All of the programs have similar objectives in the long term, improving reliability and resiliency of the grid; however, certain programs, like Targeted Undergrounding, are not deemed smart grid technologies. The Company has determined that the Self-Optimizing Grid, and certain portions of the Enterprise Systems Upgrades, Communications Network Upgrades and Transmission Improvements programs, meet the criteria for the SGTP and will be outlined within the Plans each year as applicable. The Enterprise Systems Upgrades primarily consists of the Distribution Management System (DMS) Consolidation projects as outlined in the 2016 SGTP. Applicable projects or initiatives are included in the 2017 SGTP Update, or will be included in future SGTPs as appropriate.

These strategic programs may be comprised of multiple gated projects and annually-funded work streams to accomplish the end state objectives. Each year, the Company funds and prioritizes the work efforts through the annual budgeting process, and the following governing bodies provide oversight of the portfolio: management teams, steering teams, and the financial management committee.

Cross-functional management teams aligned around the strategic programs provide program and project governance, gating and change request oversight. The management teams are also responsible for deployment performance, business readiness, issue resolution, and benefit tracking and reporting. Steering teams provide strategic oversight of all programs and projects to ensure alignment with enterprise, regulatory, financial, customer and operational strategies. Steering teams are responsible for portfolio performance, alignment with the grid improvement plan, cross-functional issue resolution (if escalated from the management teams) and to review and approve significant changes in the overall strategy. Finally, the financial management committee tracks the expenditures of the organizational budgets set forth by the Company. The committee also manages the reallocation of funding within the programs and projects to maintain budgetary compliance and determines available funding for emergent work, change requests, or any other item that has a financial impact to the organization.

The initial planning for the 10-year Grid Improvement Plan was completed in early 2017. Given this is a 10-year plan, the company will utilize a "progressive elaboration" process, pursuant to Project Management Institute best practices, to govern the plan throughout the lifecycle. In this process, the initial overall 10-year plan concepts are approved first, then a more detailed version of each year's plan is submitted and approved annually.

Stakeholder Outreach

Collaborative Initiatives

Through the North Carolina Public Benefits Funds, administered by Advanced Energy and Duke Energy, along with generous technical support from North Carolina's Electric Membership Cooperatives, Duke Energy and Dominion Energy North Carolina, there have been several smart grid stakeholder education initiatives.

As described in the 2016 Smart Grid Technology Plan, Advanced Energy's outreach efforts are being designed to help our state's residents make well-informed energy decisions. They want to share information about new technologies and services when they believe they can offer value, and they also want to share any concerns that may present risk. Highlights of the accomplishments over the past year include:

- Hosted a facilitated cross-sector planning meeting in November 2016 to identify priority audiences and energy related topics to focus educational and outreach efforts for 2017.

The key audiences identified by the stakeholders were: state legislators, utilities commissioners, county commissioners, municipal staff, public staff and large business customers.

- Identified a webinar series as the most efficient and flexible delivery method for the outreach and education body of work for the priority NC stakeholder audiences identified.
- The overarching goal of the webinar series was to build awareness among the targeted key decision makers on relevant smart grid topics and their effects on technology, economic development, and policy across North Carolina.

  <u>2017 NC Smart Grid Webinar Series</u>

  1. Smart Grid Basics (presented April 26, 2017)
  2. Solar Power and Grid Integration (presented May 24, 2017)
  3. Smart Meters and Advanced Metering Infrastructure (presented June 22, 2017)
  4. Microgrids and Grid Resiliency (presented September 20, 2017)
  5. Self-Optimizing Grid (scheduled October 24, 2017)
- Created a publicly accessible website, www.NCSmartGrid.org, hosted and maintained by Advanced Energy. This site contains a repository of smart grid resources, presentation collateral and video links that can be used by stakeholders state-wide. Recordings of the NC Smart Grid Webinar Series are available through the NC Smart Grid website as an ongoing resource for stakeholders.
- Future engagement activities include plans to convene a facilitated stakeholder session in November 2017, similar to that which took place in November 2016, to gather scoping input for 2018 education and outreach work.

2. Improving Reliability and Security of the Grid

Reference	Requirement
R8-60.1(c)(2)	*A description of how the proposed smart grid technology plan will improve reliability and security of the grid.*

The description for each new technology project listed under Sections 3 through 5 and the specific benefits described, outline the impacts each project will have on the reliability and security of the grid. Additionally, the grid improvement plan as a whole will provide synergies resulting in greater overall value in improving grid security, reliability and resiliency, while also creating greater efficiencies and improving safety and sustainability.

One of the primary objectives of the Power/Forward Carolinas grid improvement plan is to reduce outages. When outages do occur, the goal is to reduce the time customers are without power. There are additional objectives that will address the physical and cyber security of the grid through specific programs, and also as an ancillary result of other programs. While some of these programs may not fall into the definition of smart grid technologies, all are designed to play a vital role in modernizing the grid.

3. Current and Scheduled Technology Deployments

Reference	Requirement
R8-60.1(c)(3)	*For all smart grid technologies currently being deployed or scheduled for implementation within the next five years: (i) – (vii)*

DEP AMI Deployment

(i) A description of the technologies, including the goals and objectives of each technology, options for ensuring interoperability of the technology with the legacy system, and the expected life of the technology.

AMI is the foundational investment that will enable enhanced customer solutions - giving customers greater control, convenience and choice over their energy usage, while also giving customers the opportunity to budget, save time and save money. AMI technology allows a utility to gather more granular usage data and utilize new capabilities to offer new programs and services to customers that are not achievable through existing meters. The AMI technology will pave the way for programs that will allow customers to stay better informed during outages, control their payment due dates, avoid deposits, to be reconnected faster, and to better understand and take control of their energy usage, and ultimately, their bills. Over time, the Company also expects AMI meters to contribute to cost reductions from reduced truck rolls in the years after deployments.

Deployment of AMI meters allows customers to start, stop and move service without the need for a technician visit. The AMI meters also provide an interface for customers to see and understand their hourly energy usage, allowing them to better manage their consumption and, as a result, their bills. AMI meters will enable future customer programs such as outage notification alerts, mid-billing cycle usage alerts, a real-time usage application for smart phones, and the ability for customers to select their payment due date. The technology can also enable future energy efficiency options and potential time-of-use rate offerings as well as pre-payment programs. Current meters cannot provide these capabilities.

The proposed AMI meters are directly interoperable with the existing enterprise AMI meter systems and have a planned life of approximately 15 years.

(ii) The status and timeframe for completion.

The Board of Directors has endorsed the DEP AMI deployment project; however, the outcome of regulatory considerations in the DEP rate case could affect the Company's timing to advance the project.

(iii) A description of any existing equipment to be rendered obsolete by the new technology, its anticipated book value at time of retirement, alternative uses of the existing equipment, and the expected salvage value of the existing equipment.

The existing DEP meters that are in scope to be replaced by the AMI deployment, along with the associated communications equipment, had a net book value of approximately $89.6 M as of December 31, 2016, which is expected to be approximately $77.2 M on December 31, 2017.

(iv) A description of how the utility intends the technology to transfer information between it and the customer while maintaining the security of that information.

AMI meters capture energy usage and send it to grid routers directly, through range extenders, or through other meters to form a radio frequency (RF) mesh network. The grid routers transmit collected usage data to the AMI headend system via cellular backhaul once each day. The head-end system acts as the data collection point inbound from the metering infrastructure, as well as providing meter command and encryption key management outbound. The data is then sent to a Meter Data Management (MDM) system which provides billing determinants to the customer billing system for billing.

The data collected by the AMI meter utilizes a unique meter number (not displayed on the meter face) and thereby contains no personally identifiable customer information. All data is encrypted at the meter and decrypted at head-end system. The meter number is then used as the linkage to other information within the customer billing systems.

See additional information covered in Section 7(iv) and Appendix B related to how the utility provides usage information to customers through the secure online customer portal and billing statements.

(v) A description of how third parties will implement or utilize any portion of the technology, including transfers of customer-specific information from the utility to third parties, and how customers will authorize that information for release by the utility to third parties.

This section is not applicable as this project does not currently involve the transfer of customer information to any third-parties. Refer to Appendix B for general information on providing data to customers and third parties.

(vi) Approximate timing and amount of capital expenditures, including those already incurred.

DEP has incurred approximately $196,000 of actual capital expenditures on the AMI project through July 2017 for planning efforts. Based on the most recent cost estimate for the project, the forecast capital costs are outlined below:

DEP AMI Capital Forecast	2017	2018	2019	2020	2021
Annual Capital $ (millions)	$4.6	$72.5	$98.4	$93.6	$8.9

(vii) Analyses relied upon by the utility for installations, including an explanation of the methodology and inputs used to perform the analyses.

The analysis attached in Appendix C was presented to Company Management and Board for consideration of the project. This analysis represents total capital and operating expense deployment costs and operational benefits over a 20-year period, for the entire Duke Energy Progress service territory (North and South Carolina).

Additionally, part of the Company's strategy moving forward has been aligned with providing customers with more choice, convenience and control. Therefore, the ability to offer the enhanced customer services and programs as detailed in section *R8-60.1(c)(3)(i)* above, along with improvements in customer satisfaction, are some of the non-quantifiable benefits further supporting the Company's decision to move forward with a full AMI deployment.

For the analysis and supporting files, see Appendix C. **Exhibit A DEP AMI Deployment Analysis** outlines the project and analysis. For a summary of the costs see **Exhibit B CONFIDENTIAL DEP AMI Cost Estimate Summary**. For a summary of the benefits see **Exhibit C DEP AMI Benefits Summary**.

For the additional cost details, see **Exhibit D DEP AMI Cost Description Detail** and **Exhibit E CONFIDENTIAL DEP AMR to AMI Deployment Class 2 Final**. For additional benefit details, see **Exhibit F DEP AMI Benefit Details** and **Exhibit G CONFIDENTIAL DEP AMI Benefits Calculations and Assumptions Final**.

Self-Optimizing Grid

(i) A description of the technologies, including the goals and objectives of each technology, options for ensuring interoperability of the technology with the legacy system, and the expected life of the technology.

The Self-Optimizing Grid (SOG) Program implements additional design criteria on distribution circuits that improves reliability and enhances system resiliency. This resiliency will enable the system to reduce outage duration from fault events. Key components of the projects will involve adding capacity to distribution circuits and substation transformers and connecting radial distribution circuits together with automated switches. The head-end enterprise systems such as the Self-Healing software and the Distribution Management System (DMS) software are essential to enabling this capability.

The Self-Optimizing Grid is an advancement from Self-Healing "Networks". The Self-Healing Networks and Feeder Segmentation projects were a foundational step in the progression towards the SOG program. Instead of having individual circuit pairs that can back each other up, the integrated grid network allows for multiple circuit rerouting options to re-energize segments and minimize customer outage events. The SOG program will further segment the circuits to minimize the number of customers affected by sustained outages and ensures the necessary capacity and connectivity to fully leverage the segmentation.

Under this program, circuits will have automated switches deployed according to the SOG guidelines, which outline automated switches approximately every 400 customers, or 3 miles in circuit segment length, or 2 MW peak load. The goal of the SOG program is to have 80% of customers served from circuits that have alternate power re-routing options and sufficient capacity to re-route power without being overloaded the majority of the time. Circuits that meet these additional guidelines will have SOG capabilities.

The SOG will automatically reroute power around a problem area, like an outage caused by a tree falling across a line, animal interference, or fault events. With this automation, the grid can self-identify problems and isolate affected areas by reconfiguring the circuits, which can shorten or even eliminate outages for many customers.

Automated switch equipment typically has an approximate 20-year expected life, and control and communications equipment, an approximate 5- to 7-year expected life.

(ii) The status and timeframe for completion.

The initial engineering, scoping and planning for the SOG program began in 2017 with expectations to begin field work in 2018. The initial planning will address activities in 2018 and the planning for following years will occur as part of the annual planning process. 2018 is the first year of the expected 10-year program to achieve the anticipated goal of 80% of customers being served by the SOG.

(iii) A description of any existing equipment to be rendered obsolete by the new technology, its anticipated book value at time of retirement, alternative uses of the existing equipment, and the expected salvage value of the existing equipment.

During field work, installations will primarily consist of new equipment to achieve the new SOG guidelines. However, there will be instances where aged, automated switches, or other non-automated equipment will need to be replaced.

(iv) A description of how the utility intends the technology to transfer information between it and the customer while maintaining the security of that information.

This section is not applicable as this technology does not transfer information to/from customers.

(v) A description of how third parties will implement or utilize any portion of the technology, including transfers of customer-specific information from the utility to third parties, and how customers will authorize that information for release by the utility to third parties.

This section is not applicable as this technology does not transfer information to/from customers and will not be utilized by third-parties.

(vi) Approximate timing and amount of capital expenditures, including those already incurred.

Estimated costs through end of year 2017 are forecast to be approximately $0.42 M for planning, scope identification and engineering. Forecast capital expenditures for the next five years are as follows:

DEP (Millions)	2018	2019	2020	2021	2022
Self-Optimizing Grid	$16.0	$80.7	$79.3	$83.5	$81.5

(vii) Analyses relied upon by the utility for installations, including an explanation of the methodology and inputs used to perform the analyses.

Self-Optimizing Grid analysis uses the design criteria of segmenting the circuits for approximately 400 customers, 3 miles of circuit, or 2MW of load. Benefits can include:

- Reduces system-wide customers interrupted (CI) and customer minutes of interruption (CMI)
- Creates a networked energy system that improves operational situational awareness
- Minimizes the number of customers impacted by an outage
- Isolates problem areas for quicker mobilization and repair
- Shortens outage duration for impacted customers
- Automates system reconfigurations reducing the need for manual switching
- Improves grid resiliency and ability to recover from major events
- Enables the grid to effectively manage private distributed energy resources

4. Technologies Actively Under Consideration

Reference	Requirement
R8-60.1 (c) 4	*For all smart grid technologies actively under consideration for implementation within the next five years, the smart grid technology plan shall include a description of the technologies, including the goals and objectives of the technologies, as well as a descriptive summary of any completed analysis used by the utility in assessing the smart grid technology.*

Capacitor Bank Controls Upgrade

Duke Energy Progress has been utilizing the current capacitor bank controls for 15+ years and has nearly 3,000 units in-service today. These devices have been integral in managing the system's reactive power flow during that time. This capability allows the Company to reduce system losses and improve the real power flow capacity on its distribution and transmission system. The implementation of the Distribution System Demand Response (DSDR) program further enhanced the VAR management capabilities of the capacitor bank controls to allow for two-way communications, increased troubleshooting capabilities and automated control of the voltage and reactive power of the distribution system.

Due to the age of the devices, and a recent decision to upgrade the Distribution Management System (DMS) and Distribution Supervisory Control and Data Acquisition (DSCADA) systems, the current capacitor bank controls can no longer provide the needed support due to dated communications and security protocols of the product. Technology enhancements have deemed these products obsolete and incapable for integration into newly designed control systems.

The objective of this program is to systematically replace the obsolete capacitor bank controls with a new version of the equipment and to successfully reintegrate them into the new DMS allowing for continued capabilities of the DSDR program, as well as upgrade the hardware to meet security requirements for smart grid devices.

Benefits of this uplift effort include:

- Integrated process for implementing EM1, EM2 and DSDR capabilities
- Fully integrated security features which include door alarms allowing for increased security from physical intrusion of unauthorized parties
- Integrated Volt/VAR support allowing Company to maintain voltage support
- Reduced programming support needed to integrate two products into new DMS
- Reduced maintenance efforts needed for aged fleet of controls
- Fully enabled remote access allowing for easy updates of firmware and software enhancements

Enterprise Transmission Health & Risk Management Project

Duke Energy's Transmission Operations manages over 32,200 miles of transmission lines, nearly 10,000 transformers, and nearly 15,000 circuit breakers. As the result of modernization and record keeping over many years, the Company has access to a significant amount of data, and has begun accelerated strategies to employ data analytics to assess the health and risk of failure of the equipment. This method will optimize the utilization of these assets in order to better monitor the operational and financial health of the equipment fleet. However, in the current environment the evaluation of the fleet cannot be performed in a comprehensive manner. The Transmission Asset Management organization is using antiquated tools and manual methods to understand equipment health and to predict and react to equipment failures.

Transmission Health and Risk Management (HRM) is a philosophy for how to manage assets. This philosophy is supported by software, monitoring, data, analytics, data science and people. This project will implement a new enterprise HRM platform to collect and analyze data to prescribe how Transmission can improve the management of its assets. The Company's strategy identifies condition monitoring as a key strategic program and this work aligns with the Road Ahead strategy of modernizing the power grid.

The selected HRM solution is an advanced analytics software package that helps utilities use a systematic, data-driven approach to assess the on-going health of assets, and take specific actions to improve overall system reliability. This enterprise project is estimated at approximately $40 million and expected to be implemented over a four-year period, beginning by the end of 2017.

The HRM solution enables personnel to better manage Transmission transformer and breaker health, and capture significant value by:

- Reducing operating expenses by prioritizing replacement and maintenance actions
- Improving capital expense efficiency by prioritizing replacement and maintenance actions
- Improving customer value though improved reliability
- Reducing the likelihood of catastrophic transformer failures

HRM Project Objectives

- Implement a new HRM platform
- Develop new HRM processes
- Become proactive versus reactive by shifting from an alarming model to a predictive model that incorporates the component, asset, fleet, and system health & risk data
- Extend the lifecycle of aging assets
- Reduce asset failures or catastrophic failures

Western Carolinas Energy Storage Analysis and Deployment Plan

As stated in DEP's Western Carolinas Modernization Project (WCMP) Annual Progress Report (Docket No. E-2, Sub 1089), DEP has identified multiple opportunities to deploy energy storage in the form of batteries throughout the region, specifically to meet the Commission's order to deploy at least 5 MW of energy storage in the DEP-West region and support the avoidance or deferral of the contingent natural gas-fired Combustion Turbine. Two initial projects, which combine for over 5 MW of capacity, have been submitted to the DEP interconnection queue and are intended to provide essential reliability services, such as frequency, voltage, and ramping support, to the electric grid and capacity during system peaks as well as disconnecting ("islanding") from the grid to mitigate outages for DEP customers connected to certain feeders.

DEP continues to perform due diligence in order to de-risk and develop the initial projects, including environmental assessments, permitting, and technology selection and plans to connect each facility directly to the grid (in front of the meter) at the appropriate distribution voltage and interconnection points. The deployment of these projects will be the first of its kind in North Carolina where a major utility will own batteries to store and dispatch levels of energy significant enough to be used to adequately and reliably serve the electric system and the Company's customers.

These projects represent an opportunity for DEP to procure, install and monitor distributed energy technologies that will allow DEP to provide a smart, safe, cost-effective and reliable solution for serving customers in lieu of performing costly upgrades to and ongoing maintenance of conventional distribution facilities, such as new feeders and substation equipment, in extremely remote and land-constrained regions in Western North Carolina. Additional details regarding the two initial projects and the multi-year storage deployment plan will be provided in the next WCMP Annual Progress Report due in March of 2018.

Enterprise Communications Network Upgrades Program

<u>Strategic Fiber and Wireless Transport</u>

The backbone of Duke Energy's communications network (a.k.a. the 3rd Grid) is the transport network, which consists of fiber optical cable and microwave systems. A recent current state assessment identified 1,750 miles of fiber optic cable that needs to be evaluated for replacement (based on age) and several key fiber rings that are underperforming. Additionally, to satisfy business needs identified during the Enterprise Communications Strategy effort, Duke

Energy will expand its fiber network to connect key generating plants, operations centers, substations and other critical facilities. Microwave systems are also used to provide high capacity connectivity. Many of Duke Energy's microwave systems in place today use network technology that is becoming obsolete, and the capacity of many microwave paths is not meeting business needs.

The Strategic Fiber and Wireless Transport work stream will begin replacing end-of-life fiber optic cable and microwave systems, add fiber to new, targeted routes based on business needs, and investigate alternatives to optical ground wire to enable Duke Energy to deploy fiber faster and less costly. The Enterprise Communications strategy concluded that to move to a smarter grid, the Company needed to:

- Treat communications as the 3rd Grid (e.g., an enterprise asset) and elevate communications to the same status as the electric grid and the gas grid
- Implement Broadband Internet Protocol from the core to the edge of the grid
- Make communications grid improvements that ensure: resiliency, reliability, security, capacity, and low latency. Fiber is one of the primary ways to enhance the entire communications grid.
- Expand network infrastructure, uplifting end-of-life technology and implementing a holistic network design

Grid Wide Area Network (WAN)

The Grid WAN initiative includes efforts to replace end-of-life data network hardware on the network core and in substations, and to convert substation hardware to Internet Protocol (IP). This work stream also includes redesigning existing networks for more capacity and better resiliency, and developing strategies for the Field Area Network (FAN) and Neighborhood Area Network (NAN).

A FAN strategy is being developed to support changes to grid communications due to the emergence of solar and battery storage, microgrids and distributed intelligence. A NAN strategy will also help to optimize the value of the AMI infrastructure by enabling other use cases such as lighting controls and demand response to benefit from its two-way mesh communications, in addition to scaling it for enterprise-wide AMI.

Next Generation Cellular

Duke Energy primarily uses a cellular vendor for cellular connections to substations, distribution line devices, AMI backhaul devices, direct-connect meters and load management switches. A significant number of these modems use 2G/3G technology which will be decommissioned by the cellular vendor by the end of 2022. Therefore, the Company will need to replace its 2G/3G cellular modems by the end of 2022. Some of these modems may be replaced by other efforts, such as the enterprise roll-out of AMI and the replacement of end-of-life substation routers; however, any remaining modems will be replaced as part of this work stream.

5. Technology Pilots and Initiatives

Reference	Requirement
R8-60.1 (c) 5	*For each pilot project or initiative currently underway or planned within the next two years to evaluate smart grid technologies: (i) – (v)*

At this time, the Company does not have any new pilot projects or initiatives to evaluate smart grid technologies.

6. Projects No Longer Being Considered

Reference	Requirement
R8-60.1 (c) 6	*A description of each project or initiative described in a previous plan that is no longer under consideration by the utility, and the basis for the decision to end consideration of each project or initiative.*

At this time, the Company does not have any projects or initiatives that are no longer under consideration.

7. Advanced Metering Infrastructure (AMI) Summary

Reference	Requirement
R8-60.1 (c) 7	*For automated metering infrastructure (AMI), in addition to the information required in subsections (3) or (4) of this section, as appropriate, the utility shall also provide: (i) – (iv)*

(i) A table indicating the extent to which AMI meters have been installed in the utility's service territory and specifically in North Carolina, the North Carolina jurisdictional customer classes and/or tariffs of customers with AMI, and the predicted lifespans of these installations. This table should indicate the number of AMI meters that has been installed both cumulatively and since the filing of the last smart grid technology plan.
(ii) The number of meters in North Carolina that use traditional metering technology and/or automated meter reading (AMR) technology, and the predicted lifespans for these installations.

Meters installed in DEP North Carolina as of August 2017

Customer Class	AMI Meters	AMR Meters	Walk-By & Other Meters
NC Residential	20,422	1,158,462	5,909
NC Commercial	35,099	155,079	18,293
NC Industrial	1,296	651	2,658
NC Company Use & Other	2	437	0
Totals	**56,819**	**1,314,629**	**26,860**

DEP has installed approximately 182 AMI meters since the information provided in the 2016 Smart Grid Technology Plan. The predicted lifespan of the AMI meters is approximately 15 years, and all other meters currently installed have a predicted lifespan of 15-20 year.

(iii) Any adjustment made by the utility to its capital accounting due to AMI, including the dollar amount of write-downs of its meter inventories.

As of the time of this filing, the Company has not made any capital accounting adjustments due to AMI. DEP is awaiting Commission approval in Docket No. E-2, Sub 1142 for the Company's request to include the amount for retired meters in a regulatory asset.

(iv) A discussion of what AMI services or functions are currently being utilized, as well as any plans for implementing other AMI services or functions within the next two years.

At this time, the primary AMI functionality being utilized is the remote meter reading capability.

Once the proposed AMI deployment project is complete, along with the remote meter reading, the AMI meters will also provide enhanced detection of meter tampering. DEP plans to utilize the remote order fulfillment capabilities of the meters, allowing for remote off-cycle reads or re-reads, remote reconnections and disconnections, and read-in/read-out orders to stop or start service.

Additionally, DEP also plans to provide the ability to access day prior electric usage information via the internet-based Customer Portal. The Portal will display usage information up to and including prior day usage. Customers will be able to view daily and average energy usage by billing cycle or month. Customers will also be able to view average energy usage by day-of-week, and hourly energy usage by day or week. Time-of-Use and Demand customers are able to view the information above, and can also see the date and hour when the peak usage or peak demand occurred, for the current or selected billing cycle. Customers will have the ability to download their hourly usage data from the Customer Portal in a .CSV format.

Appendix A – Proposed Changes to Data Access Rules

Pursuant to the North Carolina Utilities Commission's March 29, 2017 *Order Accepting Smart Grid Technology Plans* (March 29, 2017 SGTP Order) in Docket No. E-100, Sub 147, requesting that the electric utilities, the Public Staff, and all interested parties continue discussing potential rule changes related to customer data access, and that Duke include a report on those discussions in its 2017 SGTPs, DEC and DEP provide the following report:

Since the issuance of the Commission's March 29, 2017 SGTP Order, DEC and DEP have not had any formal discussions with NCSEA and the Public Staff regarding potential rule changes to address data access issues. During 2017, DEC and DEP had some discussions related to data access issues with NCSEA and the Public Staff in the context of a legislative stakeholder process, but no such legislation was ultimately enacted. The Companies remain willing to have further discussions should the Commission decide to engage in such rulemaking.

Appendix B – Responses to Questions in Commission's August 23, 2013 Order in Docket No. E-100, Sub 137

Pursuant to the North Carolina Utilities Commission's March 29, 2017 *Order Accepting Smart Grid Technology Plans* in Docket No. E-100, Sub 147, that DEC and DEP "update their responses to the questions posed in the Commission's August 23, 2013 Order and include those responses in future SGTP filings," Duke Energy Progress provides the following response:

The Company has had no significant revisions to the responses provided in the 2016 Smart Grid Technology Plan, Appendix B.

Appendix C – DEP AMI Analysis Files

Exhibit A

DEP AMI Deployment Analysis

Executive Summary

The DEP AMI Deployment project is an effort to fully deploy Advanced Metering Infrastructure (AMI) across the Duke Energy Progress service territory. The deployment, planned to begin in Q1 2018, will include field installations of metering and communication equipment, as well as field and back office efforts to optimize the AMI network. By leveraging deployment experience and pre-established vendor relationships from AMI deployments in other Duke Energy jurisdictions, this project is expected to complete the meter replacements in less than three years. The deployment will utilize the Enterprise solution for AMI—Itron OpenWay. Over 1.5 million Itron OpenWay AMI meters have been installed to date, with full deployments underway in Duke Energy Carolinas and Duke Energy Indiana.

The DEP AMI Deployment will enable the company to leverage AMI for significant customer and operational benefits. The complete AMI architecture is foundational to providing the Enhanced Customer Solutions (ECS) designed to offer increased control, convenience, choice, and transparency. These Enhanced Customer Solutions, which include offerings such as remote connect/disconnect, usage alerts, customer usage mobile application, outage and voltage alerts, Prepaid Advantage, and choose your own due date, are key to improving customer satisfaction (See Appendix 1). Operational benefits include significantly reducing field trips for meter reading, reconnecting power, and disconnecting power. In addition, advanced metering provides frequent and robust data enabling the company to more accurately detect revenue loss, bolster grid telemetry, monitor voltage quality, and improve outage management.

The net book value of the metering assets to be replaced in DEP as part of this project was approximately $89.6MM as of December 2016, and is expected to be approximately $77.2MM at year-end 2017.

Project Description

Business Unit	Grid Solutions / Distribution Operations / Customer Solutions			
Executive Sponsors	Lee Mazzocchi / Lloyd Yates / Sasha Weintraub / David Fountain			
Project Location	Duke Energy Progress			
Investment Date	February 28, 2017 (Project Start) March 15, 2018 (Deployment Start)			
In-Service Date	December 31, 2020 (Deployment Complete) June 30, 2021 (Project Complete) Meters will be placed in-service as installed			
Project Capital Costs ($M)	Estimate:	$280MM	Variance from Plan:	$0
Program Cost Estimate Class	Class 3			
Program Profile Risk Matrix	Green III			

Exhibit A

System Description

Strategic Rationale

Advanced metering has proven its value to both customers and the business in strategic predecessor projects throughout the Enterprise. Installation of AMI in the DEP service territory will enable the most cost-effective operational processes for metering and is a foundational step to provide a suite of services that have become standard in business and the electric utility industry. As Duke Energy customers increasingly demand these services and the pressures on the Company to reduce operational costs grow stronger, it is critical to accelerate the deployment of AMI.

Background

There are currently 1.565 million meters in the Duke Energy Progress service territory, the majority of which are read monthly by the mobile meter reading system. In addition, a small number (65K) of Silver Springs Network (SSN) AMI meters were installed from 2012-2013, replacing walk-by meters as part of a DOE grant. SSN is a hosted AMI solution, which does not support enhanced customer offerings and results in high on-going maintenance fees.

This project will replace both the mobile and SSN metering solutions in DEP with Itron OpenWay AMI– Duke Energy's Enterprise AMI solution. Itron offers a cost-effective technology that will provide significant reductions in operating cost and increased functionality. This technology also fully aligns with and enables the full suite of Enhanced Customer Solutions. With the Itron AMI solution, customers will benefit from the ability to participate in all future offerings, such as timely outage notifications and increased transparency into their energy usage.

Scope

This effort will fully deploy Itron OpenWay AMI technology across the Duke Energy Progress service territory. The project has been broken down into the following areas:

Advanced Metering Infrastructure Pre-Scale Deployment

- Perform vendor and technology pilot to ensure end-to-end system functions properly and there is no impact to customer billing by deploying 100 meters and required communication infrastructure
    - Q4 2017 - Q1 2018

Advanced Metering Infrastructure Deployment

- Deploy ~1.56M Itron OpenWay AMI electric meters
    - Q1 2018 - Q4 2020
- Install and optimize the Itron AMI network, leveraging Cisco IPv6 technology
    - Q1 2018 - Q2 2021

Contractor/Vendor/Technology Selection

Meter Installation Contractors:

Duke Energy currently has Master Service Agreements with four meter installation vendors, of which three are currently installing AMI in Duke Energy jurisdictions. For the DEP AMI Deployment, Duke Energy will include these four vendors in the bid process and consider additional vendors due to the amount of work across all AMI vendors during the deployment period. The DEP AMI Deployment will likely leverage three vendors to complete the deployment. Utilizing multiple vendors will minimize the risk of non-performance from a single vendor and shift volume in a way that improves productivity and efficiency. In addition, the multiple installation vendor approach will help reduce risk of a single vendor not meeting the scheduled deployment timeline.

The three vendors currently installing at Duke Energy as part of the DEC and DEI AMI deployments have proven track records. Prior to selection, these vendors were thoroughly vetted, including verifying references, financial screenings, and a completed scoring matrix (Commercial & Technical).

Meter Manufacturer:

Itron will be the technology vendor of the OpenWay AMI solution. Itron was selected as part of a rigorous RFQ process completed in 2014. During this process, a number of prequalified industry leaders in AMI were solicited, four of which responded. The vendors were subsequently scored by multifunctional teams in both commercial and technical areas. Each team used a standardized approach to weigh key attributes within its focus areas, ensuring each vendor was fairly ranked. At the completion of this exercise, the Itron OpenWay solution was identified as the leader and was awarded the RFQ. This technology is being leveraged moving forward with all future AMI deployments. Also, Itron will manufacture the meters and communication devices within the United States, primarily at the plant located in Oconee, South Carolina.

Itron has proven the OpenWay AMI solution at several large utilities, including over 20 major AMI deployments and more than 20 million endpoints deployed. There are currently over 1.5 million total

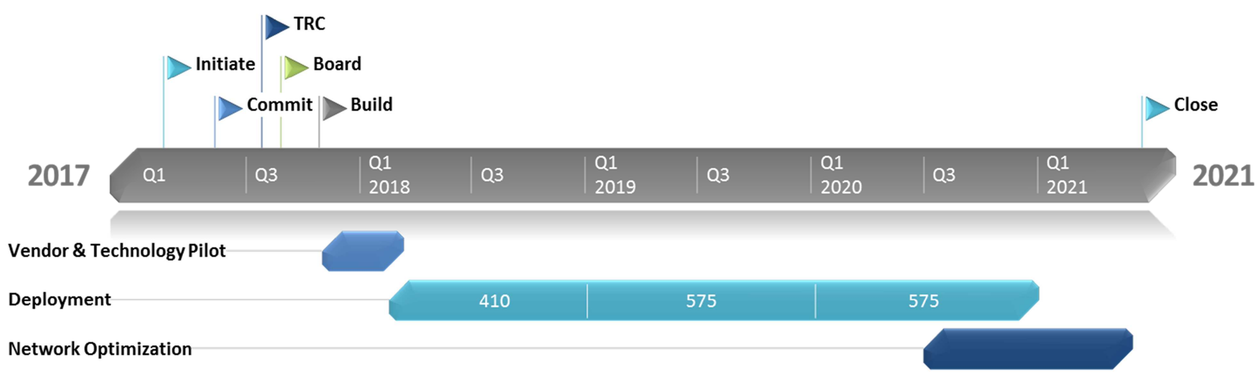
Exhibit A

OpenWay endpoints installed in the Duke Energy Carolinas, Duke Energy Indiana, Duke Energy Ohio, and Duke Energy Kentucky service territories. These deployments leverage several different communication offerings available within the OpenWay platform. The DEP AMI Deployment will take a hybrid approach that will utilize both the Cisco IPv6 mesh and 4G cellular provider networks. Specifically, the project will install the Itron IPv6 electric mesh meter for most applications. In addition to the mesh meter, the 4G LTE cellular meter will be installed in remote, rural, and hard-to-reach locations where the 4G solution is more cost-effective than building out a Cisco IPv6 mesh network. Using this hybrid approach to communications, which has been well-demonstrated in other Duke Energy jurisdictions, will enable more customers to receive the full benefits of AMI.

Meter Data Management System (MDMS):

The Enterprise solution for AMI meter data management is the Oracle Meter Data Management System (MDMS). This system provides functionality to collect and validate the accuracy of interval AMI data prior to billing. In addition, the MDMS calculates bill determinants, allowing the billing system to generate customer bills. There are currently over 1.5 million Itron AMI meters being billed through this system. The DEP AMI Deployment project will continue to leverage MDMS to support data collection, billing, and the Enhanced Customer Solutions enabled by AMI technology.

Schedule & Milestones



Contractual Structure, Compliance & Legal Discussion

Itron (Meter Manufacturer):

This project will leverage the existing Itron Master Agreement executed in 2012, which includes software, hardware, services, and maintenance. The Master Agreement was amended to reduce overall cost based on the AMI meter volumes approved by the Company in 2016. This will result in significant discounts that apply to all future AMI meter purchases. In addition, the Master Agreement has several unique clauses that provide protection to Duke Energy based on the complexity of the technology. This Master Agreement is being leveraged for all on-going Itron AMI deployments. The term of the contract will run through April 2022.

Installation Vendors:

Master Service Agreements have been established with four potential installation vendors. Each of the Master Agreements contains language specific to safety requirements, security, termination for convenience, and an attachment for a third party service provider agreement. The Agreements have been structured such that the vendor will be paid only for installed units; the vendor will not be paid for units that are returned to the utility.

Once the project has received approval, the vendors will be solicited to provide a quote for completing the installation for the DEP AMI Deployment. Taking into consideration the Enterprise-wide installation strategy, along with commercial and technical terms, the project will be awarded to the best evaluated vendors.

Communication Device Installations:

The communication equipment will be installed by a combination of Duke Energy staff (as resources are available) and existing Delivery Operations-approved contractors (with existing Master Service Agreements).

Alternative Analysis

During the Regulated Utility Strategy Development (RUSD) work, a detailed analysis of alternatives capable of providing a basic level of defined customer offerings was conducted. It was determined that the AMI system is the only commercially-available technology capable of providing and supporting these offerings/services. Provision of these services is viewed as critical to the objective of expanding customer offerings that will lead to greater customer satisfaction.

In addition, the analysis evaluated the technology landscape for utility metering. This included hosting multiple roadmap sessions with the technology offices of key meter manufacturing companies and consulting with an EPRI representative. Based on these sessions and additional industry research, it was determined that a potential leap in technology would most likely not occur before 2030, at least not in a commercially viable product ready for utility installation at over 1.5 million delivery points. Therefore, the recommendation was to accelerate the deployment rate of the Itron OpenWay AMI platform, allowing the benefits of AMI to be realized for both customers and the Company, while allowing adequate time to fully recover the AMI system assets. It was concluded that the only present alternative to AMI would be to postpone the deployment until the next generation of technology is available.

Project Costs & Contingency

The DEP AMI Deployment project team has leveraged significant experience from predecessor AMI deployments in developing the cost estimate. Below is a summary of major cost components.

Materials[1]	$198,056,885
Project Labor[2]	$22,687,505
Equipment Installation[2]	$37,992,150
Labor Escalation	$1,766,413
Overhead Allocation[3]	$2,471,519
Estimate Contingency[4]	$11,517,479
Risk Contingency[4]	$3,670,524
AFUDC[5]	$0
Total	$278,162,475

[1] Material costs were calculated using the contractual pricing that has already been established with the vendor.
[2] Project labor and installation costs are based on experience from past and on-going AMI deployments projects.
[3] Overhead allocations are based on forecasted staffing needs and the total cost of expected projects that these charges would be distributed amongst.

Exhibit A

[4] Appropriate contingency for materials and labor is included in the cost estimate to account for estimate uncertainty. In addition to contingency, several risks were identified and monetized. The Expected Monetary Value (EMV) of project risks is included in the estimate and the top risks are detailed in section 4.1. Total contingency (estimate uncertainty and risk EMV) is approximately 5.8%, which is within the PMCoE normal range. The contingency is deemed appropriate based on estimate maturity and firm contract pricing for materials.

[5] There will be no AFUDC, as AMI meters are placed in-service and considered used and useful upon installation.

Total Costs & Benefits

	Actuals	Year 1	Year 2	Year 3	Year 4	Year 5	Years 6-20	Total
Total Cost ($ in Millions)	2016	2017	2018	2019	2020	2021		
Capital Project Costs	$ 0.05	$ 4.72	$ 72.47	$ 98.39	$ 93.64	$ 8.87	$ -	$ 278.14
Capital Recurring Costs	$ -	$ -	$ 0.21	$ 0.51	$ 0.80	$ 0.86	$ 35.16	$ 37.54
O&M Program Costs	$ -	$ -	$ 0.02	$ -	$ -	$ -	$ -	$ 0.02
O&M Recurring costs	$ -	$ -	$ 0.85	$ 1.83	$ 2.62	$ 2.98	$ 50.66	$ 58.94
Total Capital	**$ 0.05**	**$ 4.72**	**$ 72.68**	**$ 98.90**	**$ 94.44**	**$ 9.73**	**$ 35.16**	**$ 315.68**
Total O&M	**$ -**	**$ -**	**$ 0.87**	**$ 1.83**	**$ 2.62**	**$ 2.98**	**$ 50.66**	**$ 58.96**
Total Annual Costs	**$ 0.05**	**$ 4.72**	**$ 73.55**	**$ 100.73**	**$ 97.06**	**$ 12.71**	**$ 85.82**	**$ 374.64**

		Year 1	Year 2	Year 3	Year 4	Year 5	Years 6-20	Total
Total Benefits ($ in Millions)		2017	2018	2019	2020	2021		
Expense Reduction	Meter Reading Cost Reduction	$ -	$ -	$ 0.40	$ 0.85	$ 3.12	$ 47.63	$ 52.00
	Field Metering (Temp to Capital)	$ -	$ 0.98	$ 1.40	$ 1.40	$ -	$ -	$ 3.78
	Reduced Meter Operations Costs	$ -	$ 0.03	$ 0.10	$ 0.10	$ -	$ -	$ 0.23
	Consumer Order Cost Reduction	$ -	$ 0.13	$ 1.52	$ 2.91	$ 3.70	$ 57.13	$ 65.39
	Consumer Order Cost Reduction (DNP)	$ -	$ -	$ -	$ 0.73	$ 0.94	$ 14.44	$ 16.11
	Cellular Cost Reduction (SSN APs)	$ -	$ -	$ 0.01	$ 0.06	$ 0.12	$ 1.80	$ 1.99
Avoided Costs - O&M	Restoration Cost Reduction - OK on Arrival	$ -	$ 0.05	$ 0.22	$ 0.43	$ 0.55	$ 8.45	$ 9.70
	Restoration Cost Reduction - Major Storms	$ -	$ 0.06	$ 0.29	$ 0.81	$ 0.98	$ 14.97	$ 17.11
	Miscellaneous O&M Savings	$ -	$ 0.04	$ 0.37	$ 0.87	$ 1.06	$ 16.15	$ 18.49
Avoided Costs - Capital	Miscellaneous Capital Savings	$ -	$ 0.01	$ 0.12	$ 0.29	$ 0.35	$ 5.38	$ 6.15
	Reduced Legacy Meter Failures	$ -	$ 0.01	$ 0.06	$ 0.11	$ 0.14	$ 2.12	$ 2.44
Increased Revenue	Non-Technical Line Loss Reduction	$ -	$ 1.68	$ 7.26	$ 13.57	$ 16.88	$ 219.30	$ 258.69
	Total O&M Expense Reductions	**$ -**	**$ 1.13**	**$ 3.43**	**$ 6.05**	**$ 7.88**	**$ 120.99**	**$ 139.48**
	Total Avoided O&M Costs	**$ -**	**$ 0.15**	**$ 0.89**	**$ 2.11**	**$ 2.59**	**$ 39.58**	**$ 45.32**
	Total Avoided Capital & Increased Revenue	**$ -**	**$ 1.70**	**$ 7.44**	**$ 13.97**	**$ 17.37**	**$ 226.81**	**$ 267.29**
	Total Annual Benefits	**$ -**	**$ 2.99**	**$ 11.75**	**$ 22.13**	**$ 27.84**	**$ 387.37**	**$ 452.08**

Exhibit A

Financial Analysis

($ in Millions)	2016	2017	2018	2019	2020	2021
Project Capital Expenditures	0.05	4.72	72.47	98.39	93.64	8.87
Project O&M Expenses	-	-	0.02	-	-	-
Net Income	-	(0.1)	(2.1)	(0.1)	4.3	9.9
Return on Equity (%)	- 1.2%	- 6.7%	- 5.6%	- 0.1%	3.9%	10.3%

Regulatory Revenue Lag

($ in Millions)	2016	2017	2018	2019	2020	2021
Pro Forma Annual Revenue	-	-	0.6	9.9	22.7	33.8
Annual Revenue Requirement	-	0.6	9.9	22.7	33.8	33.7
Regulatory Revenue Lag	-	(0.6)	(9.3)	(12.8)	(11.1)	0.1

Detailed financial analysis is presented in Appendix 2.

Risks & Mitigations

Top Risks	Impact	Discussion & Mitigation
Communications Equipment Requirements Exceed Plan	Financial	If more range extenders and/or CGRs are needed for the mesh network to communicate, then the project's direct materials costs and installation costs will exceed budget. Detailed network design will be obtained prior to deployment. Appropriate contingency is included in cost.
Installation Vendor Underbid	Financial	If installation vendor underestimates cost, or costs to support equipment installation increase (e.g. gas prices), then equipment installations costs will exceed budget. Proactive auditing of contractors and Duke resources will be performed over the life of the project.
Installation Vendor Pricing Bid is not similar to DEC or DEI AMI RFQs	Financial	If the assumption that installation vendor pricing bids will be similar to DEC and DEI RFQ pricing is incorrect, then installation costs may exceed budget. Estimated installation costs are based on the highest vendor responses to the DEI AMI and DEC AMI RFQ's with an added $1 per meter and 5% contingency for future rate discussions.
Increase in Required 4G Cellular (Direct Connect) Meters	Financial	If more 4G cellular meters are required due to poor mesh communications, then the project direct materials costs may exceed budget and installation costs may increase due to revisits. Detailed design will be obtained prior to deployment. Appropriate contingency is included in cost estimate.
Resource Constraint (Meter Installation Vendors)	Financial	If one of the installation vendors is unable to adequately staff or meet deployment expectations, then the project deployment schedule could be delayed. Project plans to utilize proven vendors from predecessor/on-going AMI projects at Duke. Three vendors will be used to mitigate risk of nonperformance from any one vendor. Also plan to include additional vendors under a Master Agreement, in case the need arises to move quickly to another vendor.
Delay in MDM-CIM Integration project	Financial	If the Phase 1 go-live for the MDM-CIM billing integration project is delayed by 30 days or more, then the deployment start date would be delayed. Project will work closely with the MDM-CIM project team to proactively identify any potential delays. Pre-Scale Deployment timeline includes contingency to account for reasonable delays to MDM-CIM go-live.

Exhibit A

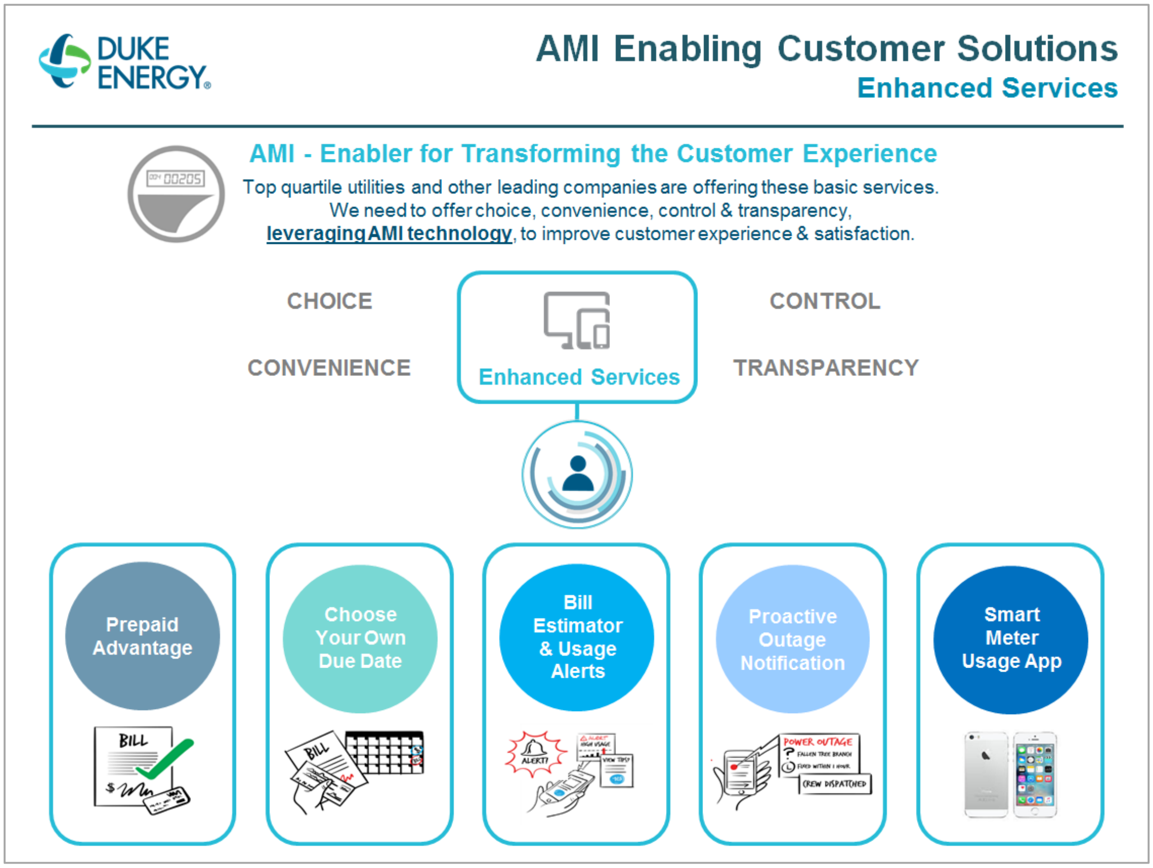
Resource Constraint (Availability of Skilled Mitigation Resources)	Financial	If skilled mitigation resources are limited or unavailable, then the necessary level of investigation, data diagnostics, and meter data interpretation necessary to resolve problems will not occur, resulting in delays to the project deployment schedule and certification of meters. Resource constraint probability is low. Contingency plan includes utilizing Itron resources for mitigation.

Stakeholder Discussion

Stakeholder	Discussion of Interest & Impact	Assessment
Customers	• Project will bring AMI capabilities to 1.56 million customers in DEP, allowing DEP customers to receive all of the AMI-enabled products and services offerings that will be available in neighboring jurisdictions. • The Enhanced Customer Solutions enabled by AMI will improve customer experience and satisfaction by offering increased choice, control, convenience, and transparency. • Deployment methodology will leverage experience from predecessor AMI deployments, including approach to customer awareness and deployment information.	F
Community	• One benefit of AMI is the ability to remotely complete certain routine work such as disconnects, reconnects, and meter reads. This will result in a reduction in the amount of miles driven by the Company, reducing its overall carbon footprint. • AMI deployment will enable renewable energy customers to have increased visibility into their energy profile.	F
Employees	• Project aligns with company's Road Ahead goals of enhancing operational efficiencies, supporting achievement of the company's financial objectives through O&M reductions, and improving the lives of our customers through enhanced customer offerings. • Impacted employee stakeholder groups have been consulted in development of this effort and will continue to be actively engaged throughout deployment.	F
Shareholders	• Project will enable enhanced customer offerings with the objective of improving customer satisfaction, reduce operating costs by automating meter reading and enabling remote connects and disconnects, and increase revenue capture by reducing theft, tampering, and equipment failures	F
Regulators	• NC Public Staff and SC Office of Regulatory Staff have expressed interest in the timing of a full roll-out of AMI for DEP. In its March 29, 2017 Order accepting the 2016 SGTPs, the NCUC directed DEP and DEC to provide specific plans on AMI deployments in filed SGTPs prior to beginning deployment. • DEP plans to file an AMI opt-out tariff; however, the timing is contingent upon Commission approval of the DEC AMI opt-out tariff.	N
Note: Favorable (F); Unfavorable (U); Neutral (N)		

Exhibit A

Appendix 1 ECS Program



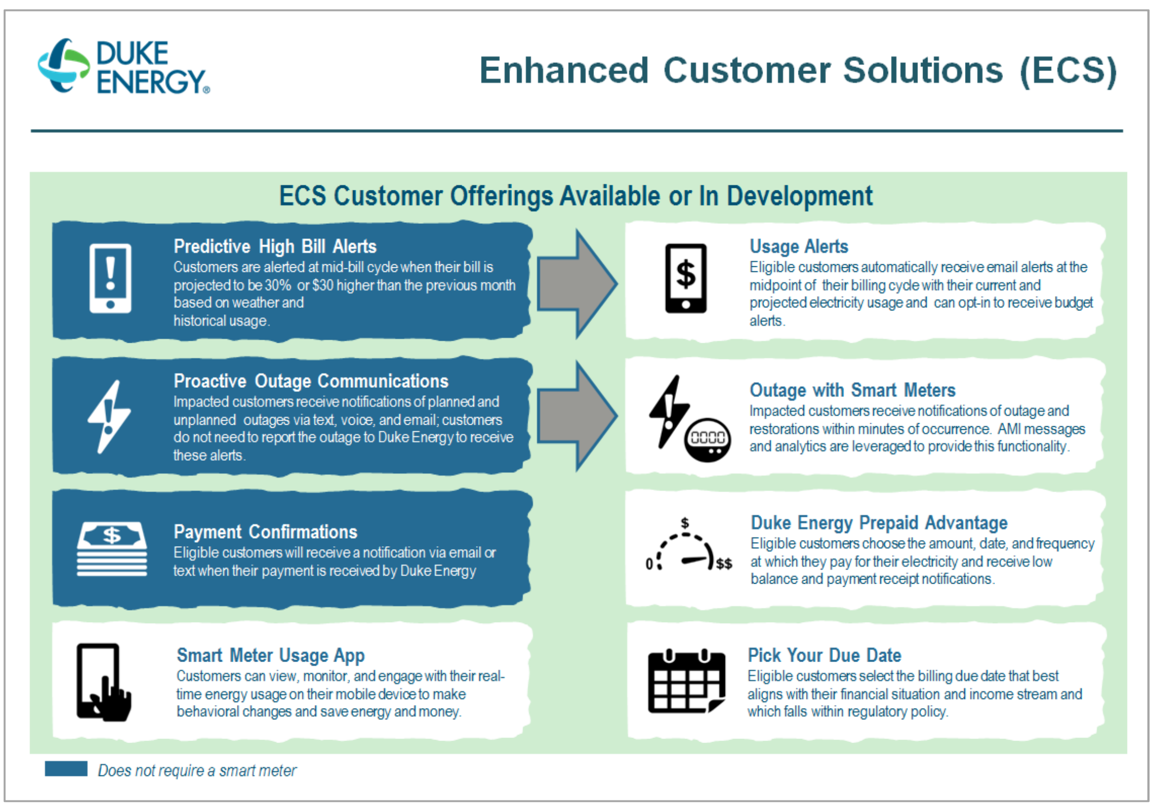


Exhibit A

Appendix 2 – Financial Analysis

Income Statement View ($ in millions)	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Retail Revenues															
Retail Rate Case Revenues	-	-	0.6	9.9	22.7	33.8	33.7	31.0	28.5	28.5	28.5	28.5	28.5	21.4	21.4
Operating Expenses	-	-	(1.7)	(3.8)	(5.6)	(6.0)	(6.2)	(6.3)	(6.3)	(6.3)	(6.4)	(6.4)	(6.5)	(6.5)	(6.5)
Operating Savings	-	-	1.3	4.3	8.2	10.5	10.8	11.2	11.5	11.8	12.2	12.6	12.9	13.3	13.7
Operating Income	-	-	0.2	10.4	25.3	38.3	38.3	35.9	33.7	34.0	34.3	34.7	34.9	28.2	28.6
Depreciation Expense	-	(0.2)	(2.7)	(8.5)	(14.9)	(18.4)	(18.7)	(18.8)	(18.9)	(19.0)	(19.1)	(19.2)	(19.6)	(20.1)	(20.4)
EBIT	-	(0.2)	(2.5)	1.9	10.4	19.9	19.6	17.1	14.8	15.0	15.2	15.5	15.3	8.1	8.2
Interest Expense	-	-	(0.7)	(2.1)	(3.5)	(3.8)	(3.3)	(2.9)	(2.5)	(2.2)	(1.9)	(1.7)	(1.6)	(1.4)	(1.3)
Income Taxes	-	0.1	1.3	-	(2.6)	(6.1)	(6.2)	(5.4)	(4.7)	(4.9)	(5.0)	(5.2)	(5.3)	(2.6)	(2.6)
Net Income	-	(0.1)	(1.9)	(0.2)	4.3	10.0	10.1	8.8	7.6	7.9	8.3	8.6	8.4	4.1	4.3
Owners' Equity	-	2.1	36.5	77.4	109.5	96.5	82.6	71.3	62.2	55.2	49.4	43.6	41.0	36.9	31.1
ROE	- 1.2%	- 6.7%	- 5.6%	- 0.1%	3.9%	10.3%	12.2%	12.4%	12.3%	14.4%	16.6%	19.4%	20.9%	11.3%	13.8%

Regulatory Revenue Lag ($ in millions)	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Pro Forma Annual Retail Revenue	-	-	0.6	9.9	22.7	33.8	33.7	31.0	28.5	28.5	28.5	28.5	28.5	21.4	21.4
Annual Revenue Requirement	-	0.6	9.9	22.7	33.8	33.7	31.0	28.5	26.4	24.8	23.4	22.0	21.4	20.7	19.6
Regulatory Lag	-	(0.6)	(9.3)	(12.8)	(11.1)	0.1	2.7	2.5	2.1	3.7	5.1	6.5	7.1	0.7	1.8

Economic Return ($ in thousands)	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Direct Method															
EBITDA	-	(26)	140	10,467	25,325	38,238	38,275	35,939	33,701	34,004	34,318	34,643	34,978	28,223	28,582
Taxes on EBITDA	-	10	(53)	(3,978)	(9,624)	(14,530)	(14,544)	(13,657)	(12,806)	(12,922)	(13,041)	(13,164)	(13,292)	(10,725)	(10,861)
Depreciation Tax Shield	-	60	1,040	3,214	5,663	6,983	7,119	7,150	7,187	7,227	7,269	7,311	7,436	7,621	7,751
Change in Deferred Taxes	-	730	4,885	13,382	18,989	15,784	8,620	3,847	(102)	(4,276)	(6,512)	(6,714)	(6,322)	(5,835)	(5,902)
Capital Expenditures	(49)	(4,721)	(72,681)	(98,902)	(94,445)	(9,733)	(1,070)	(1,344)	(1,558)	(1,632)	(1,658)	(1,661)	(8,185)	(6,473)	(3,729)
Unlevered After-Tax Cash Flows	(49)	(3,948)	(66,669)	(75,816)	(54,092)	36,741	38,400	31,936	26,422	22,403	20,377	20,415	14,616	12,812	15,841
Interest Expense	(0)	(39)	(719)	(2,122)	(3,480)	(3,836)	(3,336)	(2,866)	(2,485)	(2,186)	(1,948)	(1,733)	(1,575)	(1,449)	(1,266)
Interest Expense Tax Shield	0	15	273	806	1,322	1,458	1,268	1,089	944	831	740	658	599	551	481
Debt Financing/(Repayment)	23	1,802	30,577	36,220	28,460	(11,480)	(12,354)	(10,020)	(8,109)	(6,162)	(5,151)	(5,106)	(2,379)	(3,641)	(5,060)
Levered After-Tax Cash Flows	(26)	(2,170)	(36,537)	(40,912)	(27,789)	22,882	23,977	20,139	16,772	14,885	14,018	14,234	11,260	8,272	9,996

Sensitivities

The financial analysis above reflects rates effective 2018 resulting from the rate case filed in 2017 and subsequent rate cases every year until 2023 and every five years thereafter. Sensitivity shown below reflects alternative assumptions related to timing of the next rate case.

Scenario	Rate Case	Rates Effective	Unlevered Return
Base Case	**2018**	**2019**	6.7%
Sensitivity 1	**2019**	**2020**	6.2%
Sensitivity 2	**2020**	**2021**	5.2%
Sensitivity 3	**2021**	**2022**	4.2%

Exhibit B

REDACTED

Appendix C

DUKE ENERGY.

Grid Mod Cost Inputs - By Program and Initiative

		Initiative Name
Initiative 1		AMI/Smart Meter
DEP Meters		1,555,000

Capital - Program Costs Initial Capital

Asset	Technology	Initiative	Cost Type	Cost Subtype	Description	Total Cost	(Actuals) Actuals 2016	Year 1 2017	Year 2 2018	Year 3 2019	Year 4 2020	Year 5 2021	Year 6 2022	Year 7 2023	Year 8 2024	Year 9 2025	Year 10 2026	Year 11 2027	Year 12 2028	Year 13 2029	Year 14 2030	Year 15 2031	Year 16 2032	Year 17 2033	Year 18 2034	Year 19 2035	Year 20 2036	Total
Customer Assets	AMI/Smart Meter	AMI/ Smart Meter	Field Technology	Equipment	Costs of Communication Equipment	[redacted]							$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 20,491,975
Customer Assets	AMI/Smart Meter	AMI/ Smart Meter	Field Technology	Equipment	Cost of Meters	[redacted]							$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 177,546,284
Customer Assets	AMI/Smart Meter	AMI/ Smart Meter	Field Technology	Contractor Labor	Installation & Vendor Services (e.g. Itron)	[redacted]							$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 42,112,870
Customer Assets	AMI/Smart Meter	AMI/ Smart Meter	Field Technology	Internal Labor	Project Management Labor	$ 10,173,262	$ 45,913	$ 749,467	$ 2,979,202	$ 3,137,966	$ 2,876,786	$ 383,928	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 10,173,262
Customer Assets	AMI/Smart Meter	AMI/ Smart Meter	Field Technology	Internal Labor	Other Labor (e.g. Billing, Telecom)	$ 1,826,789	$ -	$ 74,632	$ 540,502	$ 564,655	$ 557,026	$ 89,974	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,826,789
Customer Assets	AMI/Smart Meter	AMI/ Smart Meter	Field Technology	Internal Labor	Labor to Optimize Network	$ 6,566,735	$ -	$ -	$ 1,600,690	$ 2,153,257	$ 2,186,834	$ 625,953	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 6,566,735
Customer Assets	AMI/Smart Meter	AMI/ Smart Meter	Eng. & Other Services	Contingency	Contingency (Estimate Uncertainty)	$ 11,516,547	$ -	$ 379,156	$ 1,895,781	$ 1,895,781	$ 1,895,781	$ 5,450,046	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,516,547
Customer Assets	AMI/Smart Meter	AMI/ Smart Meter	Eng. & Other Services	Contingency	Contingency (Risk)	$ 3,670,524	$ -	$ 120,844	$ 604,219	$ 604,219	$ 604,219	$ 1,737,025	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 3,670,524
Customer Assets	AMI/Smart Meter	AMI/ Smart Meter	Eng. & Other Services	Other	Overhead Allocations	$ 2,471,519	$ 3,513	$ 37,752	$ 662,625	$ 875,459	$ 842,025	$ 50,145	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 2,471,519
Customer Assets	AMI/Smart Meter	AMI/ Smart Meter	Eng. & Other Services	Other	Labor Escalation	$ 1,766,413	$ -	$ -	$ 241,160	$ 592,885	$ 806,986	$ 125,383	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,766,413
						$ 278,142,919	$ 49,426	$ 4,721,116	$ 72,467,443	$ 98,390,463	$ 93,644,950	$ 8,869,521																$ 278,142,919

O&M - Program Costs Non-Recurring O&M

Asset	Technology	Initiative	Cost Type	Cost Subtype	Description	Total Cost	Actuals 2016	Year 1 2017	Year 2 2018	Year 3 2019	Year 4 2020	Year 5 2021	Year 6 2022	Year 7 2023	Year 8 2024	Year 9 2025	Year 10 2026	Year 11 2027	Year 12 2028	Year 13 2029	Year 14 2030	Year 15 2031	Year 16 2032	Year 17 2033	Year 18 2034	Year 19 2035	Year 20 2036	Total
Customer Assets	AMI/Smart Meter	AMI/ Smart Meter	Field Technology	Equipment	Field Tools	$ 18,626	$ -	$ -	$ 18,626	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 18,626
Customer Assets	AMI/Smart Meter	AMI/ Smart Meter	Eng. & Other Services	Contingency	Contingency (Estimate Uncertainty)	$ 932	$ -	$ -	$ 932	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 932
						$ 19,558	$ -	$ -	$ 19,558	$ -	$ -	$ -																$ 19,558

Capital - Recurring Costs

Asset	Technology	Initiative	Cost Type	Cost Subtype	Description	Total Cost	Actuals 2016	Year 1 2017	Year 2 2018	Year 3 2019	Year 4 2020	Year 5 2021	Year 6 2022	Year 7 2023	Year 8 2024	Year 9 2025	Year 10 2026	Year 11 2027	Year 12 2028	Year 13 2029	Year 14 2030	Year 15 2031	Year 16 2032	Year 17 2033	Year 18 2034	Year 19 2035	Year 20 2036	Total
Customer Assets	AMI/Smart Meter	AMI/ Smart Meter	Field Technology	Equipment	Annual Costs assoc. with Comm Failures (N	$ 12,553,208	$ -	$ -	$ -	$ -	$ -	$ 3,284	$ 25,390	$ 93,086	$ 187,203	$ 243,648	$ 261,419	$ 261,419	$ 5,221,449	$ 3,912,381	$ 1,822,095	$ 45,000	$ 45,000	$ 83,629	$ 149,559	$ 198,648	$ 222,986	$ 12,776,194
Customer Assets	AMI/Smart Meter	AMI/ Smart Meter	Field Technology	Equipment	Annual Costs assoc. with Comm Failures (L	$ 3,495,974	$ -	$ -	$ 14,023	$ 34,527	$ 42,419	$ 28,434	$ 44,687	$ 45,821	$ 46,954	$ 48,088	$ 49,222	$ 50,356	$ 412,279	$ 324,039	$ 172,279	$ 54,891	$ 56,025	$ 596,652	$ 1,119,897	$ 355,380	$ 60,560	$ 3,556,534
Customer Assets	AMI/Smart Meter	AMI/ Smart Meter	Field Technology	Equipment	Annual Costs assoc. with Meter Failures &	$ 18,985,880	$ -	$ -	$ 168,727	$ 401,580	$ 636,155	$ 704,267	$ 869,833	$ 1,072,692	$ 1,189,034	$ 1,202,079	$ 1,206,975	$ 1,206,975	$ 2,405,988	$ 2,089,540	$ 1,584,245	$ 1,154,659	$ 1,154,659	$ 1,011,874	$ 667,521	$ 258,476	$ 53,904	$ 19,039,783
Customer Assets	AMI/Smart Meter	AMI/ Smart Meter	Field Technology	Equipment	Annual Costs assoc. with Meter Failures (L	$ 2,176,939	$ -	$ -	$ 30,940	$ 75,194	$ 121,667	$ 127,134	$ 129,684	$ 132,235	$ 134,785	$ 137,336	$ 139,886	$ 142,437	$ 144,987	$ 147,537	$ 150,088	$ 152,638	$ 155,189	$ 136,760	$ 88,480	$ 29,963	$ -	$ 2,176,939
						$ 37,212,001	$ -	$ -	$ 213,690	$ 511,301	$ 800,241	$ 863,119	$ 1,069,594	$ 1,343,834	$ 1,557,977	$ 1,631,750	$ 1,657,501	$ 1,661,186	$ 8,184,702	$ 6,473,498	$ 3,728,707	$ 1,407,188	$ 1,410,873	$ 1,828,915	$ 2,025,457	$ 842,466	$ 337,450	$ 37,549,450

O&M - Recurring Costs

Asset	Technology	Initiative	Cost Type	Cost Subtype	Description	Total Cost	Actuals 2016	Year 1 2017	Year 2 2018	Year 3 2019	Year 4 2020	Year 5 2021	Year 6 2022	Year 7 2023	Year 8 2024	Year 9 2025	Year 10 2026	Year 11 2027	Year 12 2028	Year 13 2029	Year 14 2030	Year 15 2031	Year 16 2032	Year 17 2033	Year 18 2034	Year 19 2035	Year 20 2036	Total
Customer Assets	AMI/Smart Meter	AMI/ Smart Meter	Field Technology	Other O&M	Cellular Costs (WAN)	$ 25,680,383	$ -	$ -	$ 641,022	$ 1,190,486	$ 1,527,248	$ 1,527,248	$ 1,527,248	$ 1,527,248	$ 1,527,248	$ 1,527,248	$ 1,527,248	$ 1,527,248	$ 1,527,248	$ 1,527,248	$ 1,527,248	$ 1,527,248	$ 1,527,248	$ 1,471,355	$ 1,338,977	$ 1,184,326	$ 1,107,000	$ 26,787,383
Customer Assets	AMI/Smart Meter	AMI/ Smart Meter	Field Technology	Other O&M	Data Analytics Labor	$ 2,252,056	$ -	$ -	$ -	$ -	$ -	$ 65,340	$ 134,082	$ 137,484	$ 140,885	$ 144,287	$ 147,689	$ 151,091	$ 154,493	$ 157,895	$ 161,297	$ 164,699	$ 168,101	$ 171,503	$ 174,904	$ 178,306	$ 178,306	$ 2,430,362
Customer Assets	AMI/Smart Meter	AMI/ Smart Meter	Field Technology	Other O&M	AMI Operators Labor	$ 2,580,211	$ -	$ -	$ -	$ -	$ -	$ 74,861	$ 153,619	$ 157,517	$ 161,414	$ 165,312	$ 169,210	$ 173,107	$ 177,005	$ 180,902	$ 184,800	$ 188,698	$ 192,595	$ 196,493	$ 200,390	$ 204,288	$ 204,288	$ 2,784,499
Customer Assets	AMI/Smart Meter	AMI/ Smart Meter	Field Technology	Other O&M	Billing Labor	$ 21,852,634	$ -	$ -	$ 207,245	$ 638,669	$ 1,093,680	$ 1,122,912	$ 1,152,144	$ 1,181,376	$ 1,210,608	$ 1,239,840	$ 1,269,072	$ 1,298,304	$ 1,327,536	$ 1,356,768	$ 1,386,000	$ 1,415,232	$ 1,444,464	$ 1,473,696	$ 1,502,928	$ 1,532,160	$ 1,532,160	$ 23,384,794
Customer Assets	AMI/Smart Meter	AMI/ Smart Meter	Field Technology	Other O&M	Telecom Labor	$ 3,287,232	$ -	$ -	$ -	$ -	$ -	$ 185,370	$ 190,195	$ 195,021	$ 199,846	$ 204,672	$ 209,498	$ 214,323	$ 219,149	$ 223,974	$ 228,800	$ 233,626	$ 238,451	$ 243,277	$ 248,102	$ 252,928	$ 252,928	$ 3,540,160
						$ 55,652,516	$ -	$ -	$ 848,267	$ 1,829,155	$ 2,620,928	$ 2,975,730	$ 3,157,288	$ 3,198,645	$ 3,240,002	$ 3,281,359	$ 3,322,716	$ 3,364,073	$ 3,405,430	$ 3,446,787	$ 3,488,144	$ 3,529,501	$ 3,570,859	$ 3,556,323	$ 3,465,302	$ 3,352,008	$ 3,274,682	$ 58,927,198

Total Cost	Actuals 2016	Year 1 2017	Year 2 2018	Year 3 2019	Year 4 2020	Year 5 2021	Year 6 2022	Year 7 2023	Year 8 2024	Year 9 2025	Year 10 2026	Year 11 2027	Year 12 2028	Year 13 2029	Year 14 2030	Year 15 2031	Year 16 2032	Year 17 2033	Year 18 2034	Year 19 2035	Year 20 2036	Total
Capital Project Costs	$ 0.05	$ 4.72	$ 72.47	$ 98.39	$ 93.64	$ 8.87	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 278.14
Capital Recurring Costs	$ -	$ -	$ 0.21	$ 0.51	$ 0.80	$ 0.86	$ 1.07	$ 1.34	$ 1.56	$ 1.63	$ 1.66	$ 1.66	$ 8.18	$ 6.47	$ 3.73	$ 1.41	$ 1.41	$ 1.83	$ 2.03	$ 0.84	$ 0.34	$ 37.20
O&M Program Costs	$ -	$ -	$ 0.02	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 0.02
O&M Recurring costs	$ -	$ -	$ 0.85	$ 1.83	$ 2.62	$ 2.98	$ 3.16	$ 3.20	$ 3.24	$ 3.28	$ 3.32	$ 3.36	$ 3.41	$ 3.45	$ 3.49	$ 3.53	$ 3.57	$ 3.56	$ 3.47	$ 3.35	$ 3.27	$ 55.67
Total Capital	$0.05	$4.72	$72.68	$98.90	$94.44	$9.73	$1.07	$1.34	$1.56	$1.63	$1.66	$1.66	$8.18	$6.47	$3.73	$1.41	$1.41	$1.83	$2.03	$0.84	$0.34	$315.34
Total O&M	$0.00	$0.00	$0.87	$1.83	$2.62	$2.98	$3.16	$3.20	$3.24	$3.28	$3.32	$3.36	$3.41	$3.45	$3.49	$3.53	$3.57	$3.56	$3.47	$3.35	$3.27	$55.69
Total Annual Costs	$0.05	$4.72	$73.55	$100.73	$97.06	$12.71	$4.23	$4.54	$4.80	$4.91	$4.98	$5.02	$11.59	$9.92	$7.22	$4.94	$4.98	$5.39	$5.50	$4.19	$3.61	$371.03

Total Cost ($ in Millions)	Actuals 2016	Year 1 2017	Year 2 2018	Year 3 2019	Year 4 2020	Year 5 2021	Years 6-20	Total
Capital Project Costs	$ 0.05	$ 4.72	$ 72.47	$ 98.39	$ 93.64	$ 8.87	$ -	$ 278.14
Capital Recurring Costs	$ -	$ -	$ 0.21	$ 0.51	$ 0.80	$ 0.86	$ 35.16	$ 37.54
O&M Program Costs	$ -	$ -	$ 0.02	$ -	$ -	$ -	$ -	$ 0.02
O&M Recurring costs	$ -	$ -	$ 0.85	$ 1.83	$ 2.62	$ 2.98	$ 50.66	$ 58.94
Total Capital	$ 0.05	$ 4.72	$ 72.68	$ 98.90	$ 94.44	$ 9.73	$ 35.16	$ 315.68
Total O&M	$ -	$ -	$ 0.87	$ 1.83	$ 2.62	$ 2.98	$ 50.66	$ 58.96
Total Annual Costs	$ 0.05	$ 4.72	$ 73.55	$ 100.73	$ 97.06	$ 12.71	$ 85.82	$ 374.64

Project Deployment and On-going Capital Costs

Project Deployment Capital Costs	Year Actuals	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	0	Check
Field Technology	$ 45,913	$ 4,183,363	$ 69,063,658	$ 94,422,120	$ 89,495,939	$ 1,506,921	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 258,717,915	
Communications	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
Eng. & Other Services	$ 3,513	$ 537,752	$ 3,403,785	$ 3,968,343	$ 4,149,011	$ 7,362,599	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 19,425,004	
Back Office Systems	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
Indirect	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
Other	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
Total	$49,426	$4,721,116	$72,467,443	$98,390,463	$93,644,950	$8,869,521	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$278,142,919	$278,142,640

Project On-going Capital Costs	Year Actuals	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	0	Check
Field Technology	$ -	$ -	$ 213,690	$ 511,301	$ 800,241	$ 863,119	$ 1,069,594	$ 1,343,834	$ 1,557,977	$ 1,631,750	$ 1,657,501	$ 1,661,186	$ 8,184,702	$ 6,473,498	$ 3,728,707	$ 1,407,188	$ 1,410,873	$ 1,828,915	$ 2,025,457	$ 842,466	$ 37,212,001	
Communications	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
Eng. & Other Services	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
Back Office Systems	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
Indirect	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
Other	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
Total	$0	$0	$213,690	$511,301	$800,241	$863,119	$1,069,594	$1,343,834	$1,557,977	$1,631,750	$1,657,501	$1,661,186	$8,184,702	$6,473,498	$3,728,707	$1,407,188	$1,410,873	$1,828,915	$2,025,457	$842,466	$37,212,001	$37,211,964

Total Cost	Actuals 2016	Year 1 2017	Year 2 2018	Year 3 2019	Year 4 2020	Years 6-20	Total		
Total Capital Program Costs	$ 0	$ 5	$ 72	$ 98	$ 94	$ 9	$ 278	$	-
Total Capital Recurring Costs	-	-	0	1	1	36	37	$	-
Total O&M Program Costs	-	-	0	-	-	-	0	$	-
Total O&M Recurring costs	-	-	1	2	3	50	56	$	-
Total Capital	$0	$5	$73	$99	$94	$45	$315	$	-
Total O&M	-	-	1	2	3	50	56	$	-
Total Annual Costs	$0	$5	$74	$101	$97	$95	$371	$	-

DUKE ENERGY — Program Benefit Inputs

	Initiative Name	Title
Initiative 1	AMI/ Smart Meter	DEP AMI

Annual Benefits ($)					Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
Asset	Technology	Initiative	Benefit Type	Duke Benefit Description	2017	2018	2019	2020	2021	2022	2023	2024
Customer Assets	AMI/Smart Meter	AMI Deployment	Expense Reduction	***Meter Reading Cost Reduction***	$ -	$ -	$ 400,000	$ 850,000	$ 3,120,000	$ 3,213,600	$ 3,310,008	$ 3,409,308
Customer Assets	AMI/Smart Meter	AMI Deployment	Expense Reduction	***Field Metering (Temp to Capital)***	$ -	$ 975,000	$ 1,400,000	$ 1,400,000	$ -	$ -	$ -	$ -
Customer Assets	AMI/Smart Meter	AMI Deployment	Expense Reduction	***Reduced Meter Operations Costs***	$ -	$ 25,000	$ 100,000	$ 100,000	$ -	$ -	$ -	$ -
Customer Assets	AMI/Smart Meter	AMI Deployment	Expense Reduction	***Consumer Order Cost Reduction***	$ -	$ 128,428	$ 1,516,821	$ 2,906,653	$ 3,704,893	$ 3,854,586	$ 3,970,223	$ 4,089,330
Customer Assets	AMI/Smart Meter	AMI Deployment	Expense Reduction	***Consumer Order Cost Reduction (DNP)***	$ -	$ -	$ -	$ 734,924	$ 936,753	$ 974,602	$ 1,003,840	$ 1,033,955
Customer Assets	AMI/Smart Meter	AMI Deployment	Expense Reduction	***Cellular Cost Reduction (SSN APs)***	$ -	$ -	$ 14,715	$ 58,860	$ 117,720	$ 121,252	$ 124,889	$ 128,636
			Expense Reduction		$ -	$ 1,128,428	$ 3,431,536	$ 6,050,438	$ 7,879,366	$ 8,164,039	$ 8,408,960	$ 8,661,229
Customer Assets	AMI/Smart Meter	AMI Deployment	Avoided Costs - O&M	***Restoration Cost Reduction - OK on Arrival***	$ -	$ 50,672	$ 224,426	$ 430,062	$ 548,168	$ 570,316	$ 587,426	$ 605,048
Customer Assets	AMI/Smart Meter	AMI Deployment	Avoided Costs - O&M	***Restoration Cost Reduction - Major Storms***	$ -	$ 60,000	$ 293,550	$ 810,900	$ 981,000	$ 1,010,430	$ 1,040,743	$ 1,071,965
Customer Assets	AMI/Smart Meter	AMI Deployment	Avoided Costs - O&M	***Miscellaneous O&M Savings***	$ -	$ 35,206	$ 372,771	$ 873,113	$ 1,058,007	$ 1,089,747	$ 1,122,440	$ 1,156,113
			Avoided Costs- O&M		$ -	$ 145,878	$ 890,747	$ 2,114,075	$ 2,587,175	$ 2,670,493	$ 2,750,608	$ 2,833,126
Customer Assets	AMI/Smart Meter	AMI Deployment	Avoided Costs - Capital	***Miscellaneous Capital Savings***	$ -	$ 11,735	$ 124,257	$ 291,038	$ 352,669	$ 363,249	$ 374,147	$ 385,371
Customer Assets	AMI/Smart Meter	AMI Deployment	Increased Revenue	***Non-Technical Line Loss Reduction***	$ -	$ 1,679,758	$ 7,259,075	$ 13,572,782	$ 16,880,299	$ 17,136,061	$ 17,221,742	$ 17,307,850
Customer Assets	AMI/Smart Meter	AMI Deployment	Avoided Costs - Capital	***Reduced Legacy Meter Failures***	$ -	$ 13,089	$ 57,303	$ 108,559	$ 139,333	$ 143,351	$ 147,652	$ 152,081
			Did not include in economic analysis model		$ -	$ 1,704,582	$ 7,440,635	$ 13,972,378	$ 17,372,301	$ 17,642,662	$ 17,743,540	$ 17,845,303
					$ -	**$ 2,978,888**	**$ 11,762,918**	**$ 22,136,890**	**$ 27,838,842**	**$ 28,477,194**	**$ 28,903,108**	**$ 29,339,658**

		Year 1	Year 2	Year 3	Year 4	Year 5	Years 6-20	Total
Total Benefits ($ in Millions)		2017	2018	2019	2020	2021		
Expense Reduction	Meter Reading Cost Reduction	$ -	$ -	$ 0.40	$ 0.85	$ 3.12	$ 47.63	$ 52.00
	Field Metering (Temp to Capital)	$ -	$ 0.98	$ 1.40	$ 1.40	$ -	$ -	$ 3.78
	Reduced Meter Operations Costs	$ -	$ 0.03	$ 0.10	$ 0.10	$ -	$ -	$ 0.23
	Consumer Order Cost Reduction	$ -	$ 0.13	$ 1.52	$ 2.91	$ 3.70	$ 57.13	$ 65.39
	Consumer Order Cost Reduction (DNP)	$ -	$ -	$ -	$ 0.73	$ 0.94	$ 14.44	$ 16.11
	Cellular Cost Reduction (SSN APs)	$ -	$ -	$ 0.01	$ 0.06	$ 0.12	$ 1.80	$ 1.99
Avoided Costs - O&M	Restoration Cost Reduction - OK on Arrival	$ -	$ 0.05	$ 0.22	$ 0.43	$ 0.55	$ 8.45	$ 9.70
	Restoration Cost Reduction - Major Storms	$ -	$ 0.06	$ 0.29	$ 0.81	$ 0.98	$ 14.97	$ 17.11
	Miscellaneous O&M Savings	$ -	$ 0.04	$ 0.37	$ 0.87	$ 1.06	$ 16.15	$ 18.49
Avoided Costs - Capital	Miscellaneous Capital Savings	$ -	$ 0.01	$ 0.12	$ 0.29	$ 0.35	$ 5.38	$ 6.15
	Reduced Legacy Meter Failures	$ -	$ 0.01	$ 0.06	$ 0.11	$ 0.14	$ 2.12	$ 2.44
Increased Revenue	Non-Technical Line Loss Reduction	$ -	$ 1.68	$ 7.26	$ 13.57	$ 16.88	$ 219.30	$ 258.69
	Total O&M Expense Reductions	**$ -**	**$ 1.13**	**$ 3.43**	**$ 6.05**	**$ 7.88**	**$ 120.99**	**$ 139.48**
	Total Avoided O&M Costs	**$ -**	**$ 0.15**	**$ 0.89**	**$ 2.11**	**$ 2.59**	**$ 39.58**	**$ 45.32**
	Total Avoided Capital & Increased Revenue	**$ -**	**$ 1.70**	**$ 7.44**	**$ 13.97**	**$ 17.37**	**$ 226.81**	**$ 267.29**
	Total Annual Benefits	**$ -**	**$ 2.99**	**$ 11.75**	**$ 22.13**	**$ 27.84**	**$ 387.37**	**$ 452.08**

Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	
2025	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**Total 20 Year**
$ 3,511,587	$ 3,616,935	$ 3,725,443	$ 3,837,206	$ 3,952,323	$ 4,070,892	$ 4,193,019	$ 4,318,810	$ 3,858,357	$ 2,192,148	$ 416,008	$ -	$ 51,995,645
$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 3,775,000
$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 225,000
$ 4,212,010	$ 4,338,370	$ 4,468,521	$ 4,602,577	$ 4,740,654	$ 4,882,874	$ 5,029,360	$ 5,180,241	$ 4,627,945	$ 2,629,395	$ 498,985	$ -	$ 65,381,865
$ 1,064,974	$ 1,096,923	$ 1,129,831	$ 1,163,725	$ 1,198,637	$ 1,234,596	$ 1,271,634	$ 1,309,783	$ 1,170,140	$ 664,822	$ 126,164	$ -	$ 16,115,303
$ 132,495	$ 136,470	$ 140,564	$ 144,781	$ 149,124	$ 153,598	$ 158,206	$ 162,952	$ 145,579	$ 82,711	$ 15,696	$ -	$ 1,988,247
$ 8,921,066	$ 9,188,698	$ 9,464,359	$ 9,748,289	$ 10,040,738	$ 10,341,960	$ 10,652,219	$ 10,971,786	$ 9,802,020	$ 5,569,076	$ 1,056,853	$ -	$ 139,481,060
$ 623,200	$ 641,896	$ 661,153	$ 680,987	$ 701,417	$ 722,459	$ 744,133	$ 766,457	$ 684,741	$ 389,040	$ 73,829	$ -	$ 9,705,429
$ 1,104,124	$ 1,137,248	$ 1,171,365	$ 1,206,506	$ 1,242,701	$ 1,279,982	$ 1,318,382	$ 1,357,933	$ 1,213,156	$ 689,262	$ 130,802	$ -	$ 17,120,052
$ 1,190,796	$ 1,226,520	$ 1,263,316	$ 1,301,215	$ 1,340,252	$ 1,380,459	$ 1,421,873	$ 1,464,529	$ 1,308,387	$ 743,368	$ 141,070	$ -	$ 18,489,182
$ 2,918,120	$ 3,005,664	$ 3,095,834	$ 3,188,709	$ 3,284,370	$ 3,382,901	$ 3,484,388	$ 3,588,920	$ 3,206,284	$ 1,821,670	$ 345,701	$ -	$ 45,314,663
$ 396,932	$ 408,840	$ 421,105	$ 433,738	$ 446,751	$ 460,153	$ 473,958	$ 488,176	$ 436,129	$ 247,789	$ 47,023	$ -	$ 6,163,061
$ 17,394,390	$ 17,481,361	$ 17,568,768	$ 17,656,612	$ 17,744,895	$ 17,833,620	$ 17,922,788	$ 18,012,402	$ 15,701,413	$ 8,704,326	$ 1,611,742	$ -	$ 258,689,884
$ 156,644	$ 161,343	$ 166,184	$ 171,169	$ 176,304	$ 181,593	$ 187,041	$ 192,652	$ 172,112	$ 97,787	$ 18,557	$ -	$ 2,442,755
$ 17,947,965	$ 18,051,545	$ 18,156,057	$ 18,261,520	$ 18,367,950	$ 18,475,366	$ 18,583,786	$ 18,693,230	$ 16,309,655	$ 9,049,902	$ 1,677,322	$ -	$ 267,295,699
$ 29,787,151	**$ 30,245,906**	**$ 30,716,249**	**$ 31,198,518**	**$ 31,693,058**	**$ 32,200,227**	**$ 32,720,394**	**$ 33,253,936**	**$ 29,317,960**	**$ 16,440,648**	**$ 3,079,877**	**$ -**	**$ 452,091,422**

(452,090,970)

AMI / Smart Meter Cost Description Definitions

Capital - Program Costs Initial Capital

Description	Definition
Costs of Communication Equipment	Material costs of the AMI communication devices, including Cisco Connected Grid Routers (CGRs) and Itron Range Extenders (RE), as well as material adders, including warehousing, handling, installment consumables (nut, bolts, etc.), and sales and use taxes.
Costs of Meters	Material costs of the OpenWay IPv6 mesh meters and 4G cellular (direct connect) meters, as well as material adders.
Installation Cost & Vendor Services	Equipment installation costs, including Duke (internal) and contractor (external) labor
Project Management Labor	Internal Project Management labor costs to support AMI implementation
Other Labor (Billing, Telecom)	Project labor costs for Billing and Telecom resources
Labor to Optimize Network	Field labor to optimize AMI network throughout implementation
Contingency (Estimated Uncertainty)	Contingency representing uncertainty in estimate components (rates, hours, materials, etc.)
Contingency (Risk)	Contingency representing Expected Monetary Value (EMV) of identified risks
Miscellaneous (Optimization Equipment)	Miscellaneous tools, equipment, and supplies required for the AMI equipment installation and project support (e.g. power cords, brackets, office supplies)
Overhead Allocations	Overhead allocations based on Project Management Organization labor
Labor Escalation	Escalation in labor costs based on DOE Escalation Rates

O&M - Program Costs Non-Recurring O&M

Description	Definition
Field Tools	Optical probes required for AMI meters
Contingency (Estimated Uncertainty)	Contingency representing uncertainty in estimate components (field tools)

Capital - Recurring Costs

Description	Definition
Annual Costs assoc. with Comm Failures (Materials)	Materials costs associated with communication device failures based on expected failure rates and replacement of equipment at the assets' end of life. Includes cost of communication equipment and material adders.
Annual Costs assoc. with Comm Failures (Labor)	Labor costs associated with communication device failures based on expected failure rates and replacement of equipment at the assets' end of life. Includes installation labor, testing labor, and labor escalation.
Annual Costs assoc. with Meter Failures & Growth (Materials)	Materials costs associated with meter failures and new customer meter growth based on expected failure rate and meter population growth rates. Includes cost of meter equipment and material adders.
Annual Costs assoc. with Meter Failures (Labor)	Labor costs associated with meter failures and new customer meter growth based on expected failure rate and meter population growth. Includes cost of installation labor and labor escalation.

O&M - Recurring Costs

Description	Definition
Cellular Costs (WAN)	Monthly cellular costs paid to Verizon for cellular backhaul on CGRs and 4G cellular (direct connect) meters
Data Analytics Labor	Additional full-time employees (FTEs) required to perform analytics on AMI data and identify non-technical line loss
AMI Operators Labor	Additional FTEs required to operate the AMI network and Head-End (HE) system, ensuring optimal communications and remote data collection for billing
Billing Labor	Additional FTEs required for data management in the billing department
Telecom Labor	Additional FTE required to manage AMI telecommunications

Owner:	Grid Solutions
Location and Program Area of Project:	Duke Energy Progress
Project Title - line 1:	DEP
Project Title - line 2 (blank if N/A):	AMR to AMI Deployment
Description of Effort:	Deploy AMI technologies in the DEP territories based upon the mesh solution
Project Ranking:	Green III
Estimate Purpose:	Commit Gate
Preparation Date (planned approval date):	17-May-17
Revision Number:	0
IPRS Number (from Reporting Team):	IPRS #317
Estimate Number (from Cost Est Log):	Est #336
Total Project Estimate	**$278,162,475**
Summary Sheets title blocks - Line 1:	Class 2 - (5% to 15%)
Summary Sheets title blocks - Line 2:	COST ESTIMATE SUMMARY
Detail Sheets title blocks - Line 1:	Class 2 - (5% to 15%)
Detail Sheet title blocks - Line 2:	COST ESTIMATE DETAIL
Wage1 (e.g. Internal, Staff Aug, Contractor):	0.00
Wage2:	0.00
Wage3:	0.00
Wage4:	0.00
Wage5:	0.00
Wage rates are weighted average for project	
Commit Date of Project (anticipated):	17-May-17
Start Date of Project (assumed):	01-Jul-16
Build Date of Project (anticipated):	21-Sep-17
End Date of Project (assumed):	30-Jun-21
Actual Cost Through:	28-Feb-17
(Actuals costs typically shown for reference only)	

DUKE ENERGY®

REDACTED

Grid Solutions
Duke Energy Progress
DEP
AMR to AMI Deployment

Class 2 - (5% to 15%)
COST ESTIMATE DETAIL

Issue Date: 05/17/17
Revision No:
IPRS No: IPRS #317
Estimate No: Est #336

Work Flow Phase WBS # / ID Task # / ID	Line Item Revision Number	DESCRIPTION	Capital/ O&M	IT&T/All Other Departments	UoM	UNIT QTY	WH UNIT	RATE	MATL UNIT	EQUIP UNIT	SUB UNIT	TOTAL WORK HOURS	LABOR $	MATERIAL $	EQUIPMENT $	SUBCONT. $	TOTAL	Spent to Date - For Reference Only	Contingency Percentage	Contingency Amount
Materials		**Materials**												**176,548,097**	**21,508,788**		**198,056,885**		**3.39%**	**6,721,277**
		Itron Meters				1,555,256														
		1S 200	Capital	All Other Departments	EA	3,661			[redacted]					[redacted]			[redacted]		3.00%	[redacted]
		2S 200	Capital	All Other Departments	EA	1,359,411													3 00%	
		2S 320	Capital	All Other Departments	EA	64,525													3 00%	
		3S 20	Capital	All Other Departments	EA	29,441													3.00%	
		5S 20	Capital	All Other Departments	EA	9,166													3 00%	
		9S 20	Capital	All Other Departments	EA	31,189													3 00%	
		12S 200	Capital	All Other Departments	EA	27,640													3.00%	
		12S 320	Capital	All Other Departments	EA	21													3.00%	
		16S 320	Capital	All Other Departments	EA	30,202													3 00%	
Current DC rate is	3 82%	Cellular - Direct Connect Adder																		
		1S 200	Capital	All Other Departments	EA	232			[redacted]					[redacted]			[redacted]		3.00%	[redacted]
		2S 200	Capital	All Other Departments	EA	50,791													3 00%	
		2S 320	Capital	All Other Departments	EA	3,195													3 00%	
		3S 20	Capital	All Other Departments	EA	1,703													3.00%	
		5S 20	Capital	All Other Departments	EA	810													3.00%	
		9S 20	Capital	All Other Departments	EA	1,805													3 00%	
		12S 200	Capital	All Other Departments	EA	36													3.00%	
		12S 320	Capital	All Other Departments	EA														3.00%	
		16S 320	Capital	All Other Departments	EA	785													3 00%	
																			3 00%	
																			3.00%	
		Meter Installations																		
Staffing Plan		Field Metering	Capital	All Other Departments	EA	103,126														
Subserv		Contractors	Capital	All Other Departments	EA	1,452,130														
		Electric Accessories	Capital	All Other Departments	LS	0 64%				159078269					1,021,282		1,021,282		5.00%	51,064
		The Electric Accessories line covers seals, retaining rings, Plexiglas covers, etc. for replacements. These are not covered in working stock – the project orders them specifically since the volumes are high																		
		Sockets (for A and K based meters)	Capital	All Other Departments	EA	3,866			330 00					1,275,780			1,275,780		5 00%	63,789
		Connected Grid Routers (CGR)	Capital	All Other Departments	EA	3,675			[redacted]					[redacted]			[redacted]		5 00%	[redacted]
Staffing Plan		Installs	Capital	All Other Departments	EA	3,675														
Staffing Plan		Mitigation installs	Capital	All Other Departments	EA	368														
		Range Extenders (RFRE)	Capital	All Other Departments	EA	10,000			[redacted]					[redacted]			[redacted]		5 00%	[redacted]
Staffing Plan		Installs	Capital	All Other Departments	EA	10,000														
Staffing Plan		Mitigation installs	Capital	All Other Departments	EA	1,000														
		Communicaton Accessories																		
		Power Cords	Capital	All Other Departments	EA	11,000			[redacted]					[redacted]			[redacted]		5.00%	[redacted]
		Brackets	Capital	All Other Departments	EA	15,043													5 00%	
		Other	Capital	All Other Departments	LS	2.00%				15432325					308,647		308,647		5 00%	15,432
		In addition to power cords and brackets, other communications accessories were approximately 2% of the range extender and CGR costs																		
	0 38	Tools and Equipment				590,997														
		Misc. field issue (meter boxes, anchor sockets, etc.)	Capital	All Other Departments	70.00%	1				413698					413,698		413,698		5.00%	20,685
		Mitigation / Installation Tools	Capital	All Other Departments	20.00%	1				118199					118,199		118,199		5.00%	5.910
		Other	Capital	All Other Departments	10.00%	1				59100					59,100		59,100		5 00%	2,955
	1.00	Miscellaneous				1,555,256														
		Printing	Capital	All Other Departments	43.00%	1				668760					668,760		668,760		5.00%	33 438
		Communications	Capital	All Other Departments	25.00%	1				388814					388,814		388,814		5 00%	19,441
		Office Supplies	Capital	All Other Departments	15 00%	1				233288					233,288		233,288		5.00%	11 664
		Personal Vehicles	Capital	All Other Departments	10.00%	1				155526					155,526		155,526		5.00%	7,776
		Postage	Capital	All Other Departments	5.00%	1				77763					77,763		77,763		5 00%	3 888
		Other	Capital	All Other Departments	2.00%	1				31105					31,105		31,105		5.00%	1.555
		O&M																		
	-	Optical Cables and Probes	O&M	All Other Departments	EA	100				150.00					15,000		15,000		5 00%	750
		Material Adders																		
	AMI	Sales Tax	Capital	All Other Departments	PCT	7 00%				148530098					10,397,107		10,397,107		5.00%	519,855
		Working Stock	Capital	All Other Departments	PCT	5.50%													5.00%	
		Stores Loading (none for AMI meters directly shipped to Contractor)	Capital	All Other Departments	PCT	10.00%													5 00%	
		10,397,107																		
	AMI	Sales Tax	Capital	All Other Departments	PCT	7 00%				10548171					738,372		738,372		5.00%	36,919
		Working Stock	Capital	All Other Departments	PCT	5.50%				11286543					620,760		620,760		5 00%	31 038
		Stores Loading (Duke installs)	Capital	All Other Departments	PCT	10.00%				11907303					1,190,730		1,190,730		5 00%	59,537
		2,549,862																		
	CGR	Sales Tax	Capital	All Other Departments	PCT	7.00%				12932325					905,263		905,263		5 00%	45,263
		Working Stock	Capital	All Other Departments	PCT	5.50%				13837588					761,067		761,067		5 00%	38,053
		Stores Loading	Capital	All Other Departments	PCT	10.00%				14598655					1,459,866		1,459,866		5.00%	72,993
		3,126,196																		

DUKE ENERGY®

REDACTED

Grid Solutions
Duke Energy Progress
DEP
AMR to AMI Deployment

Class 2 - (5% to 15%)
COST ESTIMATE DETAIL

Issue Date: 05/17/17
Revision No:
IPRS No: IPRS #317
Estimate No: Est #336

Work Flow Phase WBS # / ID Task # / ID	Line Item Revision Number	DESCRIPTION	Capital/ O&M	IT&T/All Other Departments	UoM	UNIT QTY	WH UNIT	RATE	MATL UNIT	EQUIP UNIT	SUB UNIT	TOTAL WORK HOURS	LABOR $	MATERIAL $	EQUIPMENT $	SUBCONT. $	TOTAL	*Spent to Date - For Reference Only*	*Contingency Percentage*	*Contingency Amount*
	RFRE	Sales Tax	Capital	All Other Departments	PCT	7.00%				2500000					175,000		175,000		5.00%	8,750
		Working Stock	Capital	All Other Departments	PCT	5.50%				2675000					147,125		147,125		5.00%	7,356
		Stores Loading	Capital	All Other Departments	PCT	10.00%				2822125					282,213		282,213		5.00%	14,111
		604,338																		
	AMI Misc	Sales Tax	Capital	All Other Departments	PCT	7.00%				4458315					312,082		312,082		5.00%	15,604
		Working Stock	Capital	All Other Departments	PCT	5.50%				4770397					262,372		262,372		5.00%	13,119
		Stores Loading	Capital	All Other Departments	PCT	10.00%				5032769					503,277		503,277		5.00%	25,164
		1,077,731																		
	Comm Acc	Sales Tax	Capital	All Other Departments	PCT	7.00%				1070370					74,926		74,926		5.00%	3,746
		Working Stock	Capital	All Other Departments	PCT	5.50%				1145296					62,991		62,991		5.00%	3,150
		Stores Loading	Capital	All Other Departments	PCT	10.00%				1208287					120,829		120,829		5.00%	6,041
		258,746																		
	O&M	Sales Tax	O&M	All Other Departments	PCT	7.00%				15000					1,050		1,050		5.00%	53
		Working Stock	O&M	All Other Departments	PCT	5.50%				16050					883		883		5.00%	44
		Stores Loading	O&M	All Other Departments	PCT	10.00%				16933					1,693		1,693		5.00%	85
		3,626																		

NOTE:
Apply Working Stock to materials that require it (see 'Material Loader Rates' for guidance)
For Material / Equipment $ - Estimated 'Stores Loading', 'Sales/Use Tax', 'Freight', and 'Escalation' should be included in Columns K-L also.
For Subcontract / Services $ - Estimated 'Escalation' should be included in Columns M also
For Labor $ - Fully burdened Labor $ (with Fringe, Incentive, Payroll Tax, Loader, and Escalation) should be included in Column J also.
For Labor $ - Estimated 'Meals & Travel' dollars should summed into Column J as well.
Estimating Contingency percentage should be entered in Column U.

DUKE ENERGY®

Grid Solutions
Duke Energy Progress
DEP
AMR to AMI Deployment

Class 2 - (5% to 15%)
COST ESTIMATE DETAIL

Issue Date: 05/17/17
Revision No:
IPRS No: IPRS #317
Estimate No: Est #336

Work Flow Phase WBS # / ID Task # / ID	Line Item Revision Number	DESCRIPTION	Capital/ O&M	IT&T/All Other Departments	UoM	UNIT QTY	WH UNIT	RATE	MATL UNIT	EQUIP UNIT	SUB UNIT	TOTAL WORK HOURS	LABOR $	MATERIAL $	EQUIPMENT $	SUBCONT. $	TOTAL	*Spent to Date - For Reference Only*	*Contingency Percentage*	*Contingency Amount*
Proj Support		**Project Support Labor**										**382,727**	**30,737,664**			**1,812,326**	**32,549,990**	**45,913**	**4.72%**	**1,536,884**
		Project Management																		
		Internal	Capital	All Other Departments	HRS	98,120	1.00	81.02				98,120	7,949,541				7,949,541		*5.00%*	*397,477*
		Staff Augmentation	Capital	All Other Departments	HRS	36,784	1.00	59.20				36,784	2,177,792				2,177,792		*5.00%*	*108,890*
		Field Services																		
		Internal	Capital	All Other Departments	HRS	194,555	1.00	90.69				194,555	17,643,942				17,643,942		*5.00%*	*882,197*
		Staff Augmentation	Capital	All Other Departments	HRS	20,720	1.00	55.00				20,720	1,139,600				1,139,600		*5.00%*	*56,980*
		Telecom																		
		Internal	Capital	IT&T	HRS	2,708	1.00	82.92				2,708	224,559				224,559		*5.00%*	*11,228*
		Staff Augmentation	Capital	IT&T	HRS		1.00												*5.00%*	
		Billing																		
		Internal	Capital	All Other Departments	HRS	11,720	1.00	74.87				11,720	877,430				877,430		*5.00%*	*43,872*
		Staff Augmentation	Capital	All Other Departments	HRS	18,120	1.00	40.00				18,120	724,800				724,800		*5.00%*	*36,240*
		Expenses																		
		Internal	Capital	All Other Departments	LS	1													*5.00%*	
		Staff Augmentation	Capital	All Other Departments	LS	1													*5.00%*	
		Internal	Capital	IT&T	LS	1													*5.00%*	
		Staff Augmentation	Capital	IT&T	LS	1													*5.00%*	
		Escalation																		
		Internal	Capital	All Other Departments	LS	1					1521374.22					1,521,374	1,521,374			
		Staff Augmentation	Capital	All Other Departments	LS	1					236901.25					236,901	236,901			
		Internal	Capital	IT&T	LS	1					8137.86					8,138	8,138			
		Staff Augmentation	Capital	IT&T	LS	1														
		Actuals																		
		Internal	Capital	All Other Departments	LS	1					28897.61					28,898	28,898	*28,898*		
		Staff Augmentation	Capital	All Other Departments	LS	1					17015.15					17,015	17,015	*17,015*		
		Internal	Capital	IT&T	LS	1														
		Staff Augmentation	Capital	IT&T	LS	1														
		Expenses	Capital	All Other Departments	LS	1														
		Expenses	Capital	IT&T	LS	1														

NOTE:
Apply Working Stock to materials that require it (see 'Material Loader Rates' for guidance)
For Material / Equipment $ - Estimated 'Stores Loading', 'Sales/Use Tax', 'Freight', and 'Escalation' should be included in Columns K-L also.
For Subcontract / Services $ - Estimated 'Escalation' should be included in Columns M also.
For Labor $ - Fully burdened Labor $ (with Fringe, Incentive, Payroll Tax, Loader, and Escalation) should be included in Column J also.
For Labor $ - Estimated 'Meals & Travel' dollars should summed into Column J as well.
Estimating Contingency percentage should be entered in Column U.

EXHIBIT E

APPENDIX C

REDACTED

User Notes:

1. This worksheet is linked to the date information which comes from the **Title Block** worksheet and to the Labor Loader Rates tab.
2. All data fields that are "blue" font, must be keyed in manually. All other fields are formulas.
3. In Column H, input "Unburdened" hourly rates, and ensure Column I properly calculates "Fully Burdened" rates for "Internal" resources based on applicable Labor burdens (see cells starting in G50, H50 & I50 on tab Labor Loader Rates for specific resources). For Overtime situations, add rows and adjust rates accordingly.
4. In Columns P - BW, enter only whole hours **(fractions of hours not permitted).** FTE work hours calculations in Row 7 automatically adjust for company holidays through 2020 **(update Holiday list sheet if your project extends beyond 2020)**.

[5 x 8] FTE Work Hours in Month (adjusted for company holidays) (for Reference)

Role	Job Family	Labor Class [Internal Staff Aug Contract]	Organization	Capital / O&M	IT&T/Telecom/All Other Departments	Unburdened Wage Rate	Fully Burdened Wage Rate	Estimated Hours	Estimated Labor $	Estimated Expenses	Financial View Adder	Total Estimated Labor & Expenses		160 2016 Jul-16	184 2016 Aug-16	168 2016 Sep-16	168 2016 Oct-16	160 2016 Nov-16	160 2016 Dec-16	168 2017 Jan-17	160 2017 Feb-17
Project Management							**$ 81.02**	**98,120**	**7,949,541**	**-**	**-**	**7,949,541**		-	-	-	-	-	-	-	-
Sr. Project Manager		Internal Labor	Project Management	Capital	All Other Departments	$ 63.08	$ 105.69	8,080	853,980	-	-	853,980									
CIM Business Analyst		Internal Labor	Project Management	Capital	All Other Departments	$ 46.59	$ 78.06	7,960	621,370		-	621,370									
Field Services PM		Internal Labor	Project Management	Capital	All Other Departments	$ 46.59	$ 78.06	7,960	621,370			621,370									
Communications Network		Internal Labor	Project Management	Capital	All Other Departments	$ 44.68	$ 74.87	7,080	530,052		-	530,052									
Customer Engagement		Internal Labor	Project Management	Capital	All Other Departments	$ 44.68	$ 74.87	4,720	353,368	-	-	353,368									
AMI Data		Internal Labor	Project Management	Capital	All Other Departments	$ 37.12	$ 62.19	6,480	403,021	-	-	403,021									
AMI Data Supervisor		Internal Labor	Project Management	Capital	All Other Departments	$ 46.59	$ 78.06	1,969	153,703	-		153,703									
Business Process Mgmt		Internal Labor	Project Management	Capital	All Other Departments	$ 52.12	$ 87.33	5,280	461,087	-	-	461,087									
Change Management		Internal Labor	Project Management	Capital	All Other Departments	$ 52.12	$ 87.33	6,392	558,195	-	-	558,195									
AMI Operator (Engineering Tech II)		Internal Labor	Project Management	Capital	All Other Departments	$ 33.17	$ 55.58	1,320	73,361	-	-	73,361									
EGIS Posting		Internal Labor	Project Management	Capital	All Other Departments	$ 29.62	$ 49.63	1,320	65,509	-	-	65,509									
Meter Engineering Support		Internal Labor	Project Management	Capital	All Other Departments	$ 44.68	$ 74.86	2,640	197,634	-	-	197,634									
Meter Lab		Internal Labor	Project Management	Capital	All Other Departments	$ 57.31	$ 96.02	1,176	112,923	-	-	112,923	0.20								
Meter Route Analyst		Internal Labor	Project Management	Capital	All Other Departments	$ 37.12	$ 62.19	4,410	274,278	-		274,278	0.75								
Meter Route Supervisor		Internal Labor	Project Management	Capital	All Other Departments	$ 52.12	$ 87.33	588	51,348	-	-	51,348	0.10								
Mitigation Manager		Internal Labor	Project Management	Capital	All Other Departments	$ 46.59	$ 78.06	5,920	462,124	-	-	462,124	1.00								
Project Execution Office		Internal Labor	Project Management	Capital	All Other Departments	$ 100.00	$ 167.55	1,475	247,136	-	-	247,136	0.20								
System SME (AMI)		Internal Labor	Project Management	Capital	All Other Departments	$ 46.59	$ 78.06	588	45,900	-	-	45,900	0.10								
Contractor Specialist		Internal Labor	Project Management	Capital	All Other Departments	$ 41.59	$ 69.68	5,600	390,231		-	390,231	1.00								
Contractor Specialist		Internal Labor	Project Management	Capital	All Other Departments	$ 41.59	$ 69.68	5,600	390,231		-	390,231	1.00								
Contractor Specialist		Internal Labor	Project Management	Capital	All Other Departments	$ 41.59	$ 69.68	5,600	390,231	-		390,231	1.00								
Project Director		Internal Labor	Project Management	Capital	All Other Departments	$ 79.33	$ 132.92	4,240	563,570	-	-	563,570									
CDO Manager		Internal Labor	Project Management	Capital	All Other Departments	$ 44.68	$ 74.87	1,722	128,919	-	-	128,919	0.25								
Project Management							**$ 59.20**	**36,784**	**2,177,792**	**-**	**-**	**2,177,792**		-	-	-	-	-	-	-	-
Proj Controls Spec - Cost Analyst		Staff Augmentation Labor	Project Management	Capital	All Other Departments	[redacted]	[redacted]	1,944	[redacted]	-	-	[redacted]	-								
Maximo Support	Materials Management	Staff Augmentation Labor	Project Management	Capital	All Other Departments	[redacted]	[redacted]	6,000	[redacted]	-	-	[redacted]									
Customer Engagement		Staff Augmentation Labor	Project Management	Capital	All Other Departments	[redacted]	[redacted]	5,360	[redacted]	-	-	[redacted]									
Customer Engagement		Staff Augmentation Labor	Project Management	Capital	All Other Departments	[redacted]	[redacted]	5,360	[redacted]	-	-	[redacted]									
Customer Engagement		Staff Augmentation Labor	Project Management	Capital	All Other Departments	[redacted]	[redacted]	5,520	[redacted]	-	-	[redacted]									
AMI Data		Staff Augmentation Labor	Project Management	Capital	All Other Departments	[redacted]	[redacted]	5,200	[redacted]	-	-	[redacted]									
AMI Deployment Planner		Staff Augmentation Labor	Project Management	Capital	All Other Departments	[redacted]	[redacted]	5,360	[redacted]	-	-	[redacted]									
Scheduler		Staff Augmentation Labor	Project Management	Capital	All Other Departments	[redacted]	[redacted]	2,040	[redacted]	-	-	[redacted]									
TBD		Staff Augmentation Labor	Project Management	Capital	All Other Departments	$ -	$ -	-	-	-	-	-									
TBD		Staff Augmentation Labor	Project Management	Capital	All Other Departments	$ -	$ -	-	-	-	-	-									
TBD		Staff Augmentation Labor	Project Management	Capital	All Other Departments	$ -	$ -	-	-	-	-	-									
TBD		Staff Augmentation Labor	Project Management	Capital	All Other Departments	$ -	$ -	-	-	-	-	-									
TBD		Staff Augmentation Labor	Project Management	Capital	All Other Departments	$ -	$ -	-	-	-	-	-									
TBD		Staff Augmentation Labor	Project Management	Capital	All Other Departments	$ -	$ -	-	-	-	-	-									
TBD		Staff Augmentation Labor	Project Management	Capital	All Other Departments	$ -	$ -	-	-	-	-	-									
TBD		Staff Augmentation Labor	Project Management	Capital	All Other Departments	$ -	$ -	-	-	-	-	-									
TBD		Staff Augmentation Labor	Project Management	Capital	All Other Departments	$ -	$ -	-	-	-	-	-									
Field Services							**$ 90.69**	**194,555**	**17,643,942**	**-**	**-**	**17,643,942**		-	-	-	-	-	-	-	-
Distribution Service Tech	Field Mitigation	Internal Labor	Field Services	Capital	All Other Departments	$ 55.00	$ 92.15	6,400	589,776	-	-	589,776									
Distribution Service Tech	Field Mitigation	Internal Labor	Field Services	Capital	All Other Departments	$ 55.00	$ 92.15	6,400	589,776	-	-	589,776									
Distribution Service Tech	Field Mitigation	Internal Labor	Field Services	Capital	All Other Departments	$ 55.00	$ 92.15	6,080	560,287	-	-	560,287									
Distribution Service Tech	Field Mitigation	Internal Labor	Field Services	Capital	All Other Departments	$ 55.00	$ 92.15	6,240	575,032	-	-	575,032									
Distribution Service Tech	Metering Support	Internal Labor	Field Services	Capital	All Other Departments	$ 55.00	$ 92.15	5,720	527,112	-	-	527,112									
Distribution Service Tech	Metering Support	Internal Labor	Field Services	Capital	All Other Departments	$ 55.00	$ 92.15	5,840	538,171	-	-	538,171									
Distribution Service Tech	Metering Support	Internal Labor	Field Services	Capital	All Other Departments	$ 55.00	$ 92.15	4,880	449,704	-	-	449,704									
Distribution Service Tech	Metering Support	Internal Labor	Field Services	Capital	All Other Departments	$ 55.00	$ 92.15	6,000	552,915	-	-	552,915									
Distribution Service Tech	Metering Support	Internal Labor	Field Services	Capital	All Other Departments	$ 55.00	$ 92.15	5,680	523,426	-	-	523,426									
Distribution Service Tech	Metering Support	Internal Labor	Field Services	Capital	All Other Departments	$ 55.00	$ 92.15	5,560	512,368	-	-	512,368									
Field Metering - AMI Installation		Internal Labor	Field Services	Capital	All Other Departments	$ 54.00	$ 90.48	103,124	9,330,350	-		9,330,350									
Field CGR Installation		Internal Labor	Field Services	Capital	All Other Departments	$ 58.00	$ 97.18	6,765	657,416	-		657,416	2.20								
Field RE Installation		Internal Labor	Field Services	Capital	All Other Departments	$ 45.00	$ 75.40	22,000	1,658,745	-	-	1,658,745	2.20								
Sockets (for A and K based meters)		Internal Labor	Field Services	Capital	All Other Departments	$ 89.37	$ 149.73	3,866	578,864	-	-	578,864									
TBD		Internal Labor	Field Services	Capital	All Other Departments	$ -	$ -	-	-	-	-	-									
Field Services							**$ 55.00**	**20,720**	**1,139,600**	**-**	**-**	**1,139,600**		-	-	-	-	-	-	-	-
Distribution Service Tech	Field Mitigation	Staff Augmentation Labor	Field Services	Capital	All Other Departments	[redacted]	[redacted]	4,760	[redacted]	-	-	[redacted]									
Distribution Service Tech	Field Mitigation	Staff Augmentation Labor	Field Services	Capital	All Other Departments	[redacted]	[redacted]	5,320	[redacted]	-	-	[redacted]									
Distribution Service Tech	Field Mitigation	Staff Augmentation Labor	Field Services	Capital	All Other Departments	[redacted]	[redacted]	5,320	[redacted]	-	-	[redacted]									
Distribution Service Tech	Field Mitigation	Staff Augmentation Labor	Field Services	Capital	All Other Departments	[redacted]	[redacted]	5,320	[redacted]	-	-	[redacted]									
TBD		Staff Augmentation Labor	Field Services	Capital	All Other Departments	$ -	$ -	-	-	-	-	-									
TBD		Staff Augmentation Labor	Field Services	Capital	All Other Departments	$ -	$ -	-	-	-	-	-									
TBD		Staff Augmentation Labor	Field Services	Capital	All Other Departments	$ -	$ -	-	-	-	-	-									
TBD		Staff Augmentation Labor	Field Services	Capital	All Other Departments	$ -	$ -	-	-	-	-	-									
TBD		Staff Augmentation Labor	Field Services	Capital	All Other Departments	$ -	$ -	-	-	-	-	-									
TBD		Staff Augmentation Labor	Field Services	Capital	All Other Departments	$ -	$ -	-	-	-	-	-									
TBD		Staff Augmentation Labor	Field Services	Capital	All Other Departments	$ -	$ -	-	-	-	-	-									
TBD		Staff Augmentation Labor	Field Services	Capital	All Other Departments	$ -	$ -	-	-	-	-	-									
TBD		Staff Augmentation Labor	Field Services	Capital	All Other Departments	$ -	$ -	-	-	-	-	-									
TBD		Staff Augmentation Labor	Field Services	Capital	All Other Departments	$ -	$ -	-	-	-	-	-									
TBD		Staff Augmentation Labor	Field Services	Capital	All Other Departments	$ -	$ -	-	-	-	-	-									

EXHIBIT E

APPENDIX C

REDACTED

User Notes:
1. This worksheet is linked to the date information which com
2. All data fields that are "blue" font, must be keyed in manu
3. In Column H, input "Unburdened" hourly rates, and ensure accordingly.
4. In Columns P - BW, enter only whole hours **(fractions of I**

													AMI																	
	184	152	176	176	160	184	160	176	160	152	176	160	168	168	176	168	168	184	152	184	160	152	176	160	160	176	176	160	176	176
	2017	2017	2017	2017	2017	2017	2017	2017	2017	2017	2018	2018	2018	2018	2018	2018	2018	2018	2018	2018	2018	2018	2019	2019	2019	2019	2019	2019	2019	2019
Role	Mar-17	Apr-17	May-17	Jun-17	Jul-17	Aug-17	Sep-17	Oct-17	Nov-17	Dec-17	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19	Jul-19	Aug-19
Project Management	**-**	**710**	**715**	**715**	**872**	**877**	**952**	**955**	**952**	**1,110**	**1,620**	**2,349**	**2,368**	**2,365**	**2,381**	**2,371**	**2,368**	**2,393**	**2,345**	**2,390**	**2,360**	**2,342**	**2,461**	**2,432**	**2,435**	**2,461**	**2,458**	**2,440**	**2,455**	**2,464**
Sr. Project Manager	-	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
CIM Business Analyst	-	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
Field Services PM	-	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
Communications Network	-	-	-	-	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
Customer Engagement	-	-	-	-	-	-	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	160	160	160	160	160	160	160	160
AMI Data	-	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
AMI Data Supervisor	-	-	-	-	-	-	-	-	-	-	60	53	59	56	59	62	59	59	62	56	64	59	59	56	59	59	56	64	53	62
Business Process Mgmt	-	-	-	-	-	-	-	-	-	-	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
Change Management	-	-	-	-	-	-	-	-	-	-	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
AMI Operator (Engineering Tech II)	-	-	-	-	-	-	-	-	-	-	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
EGIS Posting	-	-	-	-	-	-	-	-	-	-	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Meter Engineering Support	-	-	-	-	-	-	-	-	-	-	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80
Meter Lab	-	-	-	-	-	-	-	-	-	-	-	32	34	34	35	34	34	37	30	37	32	30	35	32	32	35	35	32	35	35
Meter Route Analyst	-	-	-	-	-	-	-	-	-	-	-	120	126	126	132	126	126	138	114	138	120	114	132	120	120	132	132	120	132	132
Meter Route Supervisor	-	-	-	-	-	-	-	-	-	-	-	16	17	17	18	17	17	18	15	18	16	15	18	16	16	18	18	16	18	18
Mitigation Manager	-	-	-	-	-	-	-	-	-	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
Project Execution Office	-	30	35	35	32	37	32	35	32	30	-	32	34	34	35	34	34	37	30	37	32	30	35	32	32	35	35	32	35	35
System SME (AMI)	-	-	-	-	-	-	-	-	-	-	-	16	17	17	18	17	17	18	15	18	16	15	18	16	16	18	18	16	18	18
Contractor Specialist	-	-	-	-	-	-	-	-	-	-	-	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
Contractor Specialist	-	-	-	-	-	-	-	-	-	-	-	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
Contractor Specialist	-	-	-	-	-	-	-	-	-	-	-	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
Project Director	-	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
CDO Manager	-	-	-	-	-	-	-	-	-	-	-	40	42	42	44	42	42	46	38	46	40	38	44	40	40	44	44	40	44	44
Project Management	**-**	**48**	**48**	**48**	**80**	**80**	**240**	**240**	**400**	**720**	**1,040**	**1,040**	**1,040**	**1,040**	**1,040**	**1,040**	**1,040**	**1,040**	**1,040**	**1,040**	**1,040**	**1,040**	**1,040**	**1,040**	**1,040**	**1,040**	**1,040**	**1,040**	**1,040**	**1,040**
Proj Controls Spec - Cost Analyst	-	8	8	8	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Maximo Support	-	-	-	-	-	-	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
Customer Engagement	-	-	-	-	-	-	-	-	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
Customer Engagement	-	-	-	-	-	-	-	-	-	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
Customer Engagement	-	-	-	-	-	-	-	-	-	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
AMI Data	-	-	-	-	-	-	-	-	-	-	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
AMI Deployment Planner	-	-	-	-	-	-	-	-	-	-	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
Scheduler	-	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field Services	**-**	**-**	**-**	**-**	**-**	**264**	**264**	**264**	**264**	**264**	**491**	**640**	**2,327**	**3,866**	**4,518**	**5,659**	**5,760**	**6,068**	**5,976**	**6,335**	**5,964**	**5,656**	**5,856**	**5,607**	**5,896**	**6,027**	**6,071**	**5,845**	**6,205**	**6,115**
Distribution Service Tech	-	-	-	-	-	-	-	-	-	-	80	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
Distribution Service Tech	-	-	-	-	-	-	-	-	-	-	80	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
Distribution Service Tech	-	-	-	-	-	-	-	-	-	-	-	-	80	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
Distribution Service Tech	-	-	-	-	-	-	-	-	-	-	-	-	80	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
Distribution Service Tech	-	-	-	-	-	-	-	-	-	-	120	120	160	160	160	120	120	120	120	120	120	120	120	120	160	160	160	160	160	160
Distribution Service Tech	-	-	-	-	-	-	-	-	-	-	-	-	-	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
Distribution Service Tech	-	-	-	-	-	-	-	-	-	-	80	80	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120
Distribution Service Tech	-	-	-	-	-	-	-	-	-	-	-	-	-	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
Distribution Service Tech	-	-	-	-	-	-	-	-	-	-	-	-	-	-	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
Distribution Service Tech	-	-	-	-	-	-	-	-	-	-	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	160	160	160	160	160
Field Metering - AMI Installation	-	-	-	-	-	-	-	-	-	-	7	-	1,127	2,122	2,586	2,884	2,951	3,183	3,116	3,382	3,110	2,884	3,116	2,936	3,116	3,183	3,216	3,050	3,315	3,249
Field CGR Installation	-	-	-	-	-	264	264	264	264	264	2	-	88	152	180	202	207	222	218	231	213	200	200	187	200	205	207	196	211	207
Field RE Installation	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	860	880	950	931	1,010	928	860	931	876	931	950	959	911	990	970
Sockets (for A and K based meters)	-	-	-	-	-	-	-	-	-	-	-	-	232	232	232	232	232	232	232	232	232	232	129	129	129	129	129	129	129	129
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field Services	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**360**	**360**	**360**	**280**	**280**	**280**	**480**	**480**	**480**	**480**	**480**	**480**	**480**	**480**	**600**	**600**	**640**	**640**	**640**	**640**
Distribution Service Tech	-	-	-	-	-	-	-	-	-	-	-	-	-	40	40	40	120	120	120	120	120	120	120	120	120	120	160	160	160	160
Distribution Service Tech	-	-	-	-	-	-	-	-	-	-	120	120	120	80	80	80	120	120	120	120	120	120	120	120	160	160	160	160	160	160
Distribution Service Tech	-	-	-	-	-	-	-	-	-	-	120	120	120	80	80	80	120	120	120	120	120	120	120	120	160	160	160	160	160	160
Distribution Service Tech	-	-	-	-	-	-	-	-	-	-	120	120	120	80	80	80	120	120	120	120	120	120	120	120	160	160	160	160	160	160
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

EXHIBIT E

APPENDIX C

REDACTED

User Notes:

1. This worksheet is linked to the date information which com
2. All data fields that are "blue" font, must be keyed in manua
3. In Column H, input "Unburdened" hourly rates, and ensure accordingly.
4. In Columns P - BW, enter only whole hours **(fractions of l**

																AMI						Project						
	160	184	152	160	176	160	168	176	160	176	176	168	168	176	152	168	160	160	176	176	160	176	168	176	168	168	160	168
	2019	2019	2019	2019	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020	2021	2021	2021	2021	2021	2021	2021	2021	2021	2021	2021	2021
Role	Sep-19	Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20	Apr-20	May-20	Jun-20	Jul-20	Aug-20	Sep-20	Oct-20	Nov-20	Dec-20	Jan-21	Feb-21	Mar-21	Apr-21	May-21	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21
Project Management	**2,438**	**2,470**	**2,547**	**2,552**	**2,584**	**2,552**	**2,565**	**2,584**	**2,552**	**2,581**	**2,581**	**2,491**	**2,408**	**2,002**	**1,835**	**1,877**	**920**	**920**	**940**	**844**	**520**	**244**	**-**	**-**	**-**	**-**	**-**	**-**
Sr Project Manager	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	80	-	-	-	-	-	-
CIM Business Analyst	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	80	40	-	-	-	-	-	-
Field Services PM	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	80	40	-	-	-	-	-	-
Communications Network	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	80	80	80	80	40	-	-	-	-	-	-	-
Customer Engagement	160	160	160	160	160	160	160	160	160	160	160	160	160	80	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AMI Data	160	160	160	160	160	160	160	160	160	160	160	80	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AMI Data Supervisor	62	56	64	56	62	56	56	62	56	59	59	62	59	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Business Process Mgmt	160	160	160	160	160	160	160	160	160	160	160	160	160	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Change Management	160	160	160	160	160	160	160	160	160	160	160	160	160	176	152	168	160	160	176	80	40	-	-	-	-	-	-	-
AMI Operator (Engineering Tech II)	40	40	40	40	40	40	40	40	40	40	40	40	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EGIS Posting	40	40	40	40	40	40	40	40	40	40	40	40	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Meter Engineering Support	80	80	80	80	80	80	80	80	80	80	80	80	80	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Meter Lab	32	37	30	32	35	32	34	35	32	35	35	34	34	35	30	34	-	-	-	-	-	-	-	-	-	-	-	-
Meter Route Analyst	120	138	114	120	132	120	126	132	120	132	132	126	126	132	114	126	-	-	-	-	-	-	-	-	-	-	-	-
Meter Route Supervisor	16	18	15	16	18	16	17	18	16	18	18	17	17	18	15	17	-	-	-	-	-	-	-	-	-	-	-	-
Mitigation Manager	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	-	-	-	-	-	-	-	-	-	-	-	-
Project Execution Office	32	37	30	32	35	32	34	35	32	35	35	34	34	35	30	34	-	-	-	-	-	-	-	-	-	-	-	-
System SME (AMI)	16	18	15	16	18	16	17	18	16	18	18	17	17	18	15	17	-	-	-	-	-	-	-	-	-	-	-	-
Contractor Specialist	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	-	-	-	-	-	-	-	-	-	-	-	-
Contractor Specialist	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	-	-	-	-	-	-	-	-	-	-	-	-
Contractor Specialist	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	-	-	-	-	-	-	-	-	-	-	-	-
Project Director	40	40	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	80	40	-	-	-	-	-	-
CDO Manager	40	46	38	40	44	40	42	44	40	44	44	42	42	44	38	42	40	40	44	44	40	44	-	-	-	-	-	-
Project Management	**1,040**	**1,040**	**1,040**	**1,040**	**1,040**	**1,040**	**1,040**	**1,040**	**1,040**	**1,040**	**1,040**	**960**	**720**	**320**	**80**	**80**	**80**	**80**	**80**	**80**	**80**	**80**	**-**	**-**	**-**	**-**	**-**	**-**
Proj Controls Spec - Cost Analyst	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	-	-	-	-	-	-
Maximo Support	160	160	160	160	160	160	160	160	160	160	160	160	160	80	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Customer Engagement	160	160	160	160	160	160	160	160	160	160	160	80	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Customer Engagement	160	160	160	160	160	160	160	160	160	160	160	160	80	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Customer Engagement	160	160	160	160	160	160	160	160	160	160	160	160	160	80	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AMI Data	160	160	160	160	160	160	160	160	160	160	160	160	80	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AMI Deployment Planner	160	160	160	160	160	160	160	160	160	160	160	160	160	80	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Scheduler	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	-	-	-	-	-	-
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field Services	**6,027**	**6,250**	**5,845**	**5,755**	**6,076**	**5,986**	**6,348**	**6,529**	**5,297**	**5,297**	**5,340**	**5,174**	**5,041**	**4,710**	**4,013**	**2,354**	**1,560**	**1,560**	**1,400**	**1,080**	**600**	**120**	**-**	**-**	**-**	**-**	**-**	**-**
Distribution Service Tech	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	80	-	-	-	-	-	-	-
Distribution Service Tech	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	80	-	-	-	-	-	-	-
Distribution Service Tech	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	80	-	-	-	-	-	-	-
Distribution Service Tech	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	80	-	-	-	-	-	-
Distribution Service Tech	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	80	-	-	-	-	-	-	-	-	-
Distribution Service Tech	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	80	-	-	-	-	-	-	-	-
Distribution Service Tech	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	40	-	-	-	-	-	-
Distribution Service Tech	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	80	-	-	-	-	-	-	-
Distribution Service Tech	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	80	-	-	-	-	-	-	-	-
Distribution Service Tech	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	80	-	-	-	-	-	-	-	-	-
Field Metering - AMI Installation	3,183	3,349	3,050	2,984	3,315	3,249	3,514	3,647	3,315	3,713	3,780	3,614	3,481	3,150	2,453	794	-	-	-	-	-	-	-	-	-	-	-	-
Field CGR Installation	205	213	196	191	211	207	224	233	211	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field RE Installation	950	999	911	891	990	970	1,049	1,089	211	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sockets (for A and K based meters)	129	129	129	129	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field Services	**640**	**640**	**640**	**640**	**640**	**640**	**640**	**640**	**640**	**640**	**640**	**640**	**640**	**640**	**640**	**640**	**640**	**320**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Distribution Service Tech	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	80	-	-	-	-	-	-	-	-	-	-
Distribution Service Tech	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	80	-	-	-	-	-	-	-	-	-	-
Distribution Service Tech	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	80	-	-	-	-	-	-	-	-	-	-
Distribution Service Tech	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	30	-	-	-	-	-	-	-	-	-	-
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

EXHIBIT E

APPENDIX C

Telecom							$ **82.92**	**2,708**	**224,559**	**-**	**-**	**224,559**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Wireless Architecture		Internal Labor	Telecom	Capital	Telecom	$ 57.31	$ 96.02	120	11,523	-	-	11,523								
Data Network Architecture		Internal Labor	Telecom	Capital	Telecom	$ 57.31	$ 96.02	120	11,523	-	-	11,523								
Radio Engineering - EDX Modeling		Internal Labor	Telecom	Capital	Telecom	$ 46.59	$ 78.06	572	44,651	-	-	44,651								
Radio Engineering - CGR Provisioning		Internal Labor	Telecom	Capital	Telecom	$ 52.12	$ 87.33	860	75,101	-	-	75,101								
Grid Telecom Support - CGR Troubleshooting		Internal Labor	Telecom	Capital	Telecom	$ 52.12	$ 87.33	96	8,383	-	-	8,383								
Radio Engineering - SSN Troubleshooting		Internal Labor	Telecom	Capital	Telecom	$ 46.59	$ 78.06	256	19,984	-	-	19,984								
Cellular Activation		Internal Labor	Telecom	Capital	Telecom	$ 46.59	$ 78.06	400	31,225	-	-	31,225								
Project Manager - Telecom		Internal Labor	Telecom	Capital	Telecom	$ 46.59	$ 78.06	284	22,169	-	-	22,169								
TBD		Internal Labor	Telecom	Capital	Telecom	$ 47.66	$ 79.86	-	-	-	-	-								
TBD		Internal Labor	Telecom	Capital	Telecom	$ -	$ -	-	-	-	-	-								
Telecom							$ **-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
TBD		Staff Augmentation Labor	Telecom	Capital	Telecom	$ 85.00	$ 85.00	-	-	-	-	-								
TBD		Staff Augmentation Labor	Telecom	Capital	Telecom	$ 100.00	$ 100.00	-	-	-	-	-								
TBD		Staff Augmentation Labor	Telecom	Capital	Telecom	$ 100.00	$ 100.00	-	-	-	-	-								
TBD		Staff Augmentation Labor	Telecom	Capital	Telecom	$ 100.00	$ 100.00	-	-	-	-	-								
TBD		Staff Augmentation Labor	Telecom	Capital	Telecom	$ 100.00	$ 100.00	-	-	-	-	-								
TBD		Staff Augmentation Labor	Telecom	Capital	Telecom	$ 100.00	$ 100.00	-	-	-	-	-								
TBD		Staff Augmentation Labor	Telecom	Capital	Telecom	$ 100.00	$ 100.00	-	-	-	-	-								
TBD		Staff Augmentation Labor	Telecom	Capital	Telecom	$ 100.00	$ 100.00	-	-	-	-	-								
TBD		Staff Augmentation Labor	Telecom	Capital	Telecom	$ 100.00	$ 100.00	-	-	-	-	-								
TBD		Staff Augmentation Labor	Telecom	Capital	Telecom	$ 100.00	$ 100.00	-	-	-	-	-								
Contractor Services							$ **19.71**	**1,481,215**	**29,196,078**	**-**	**-**	**29,196,078**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Account Manager		Contractor Labor	Contractor Services	Capital	All Other Departments	[redacted]	[redacted]	2,880	[redacted]	-	-	[redacted]								
Head End Specialist		Contractor Labor	Contractor Services	Capital	All Other Departments	[redacted]	[redacted]	6,240	[redacted]	-	-	[redacted]								
Head End Specialist		Contractor Labor	Contractor Services	Capital	All Other Departments	[redacted]	[redacted]	3,840	[redacted]	-	-	[redacted]								
Safety		Contractor Labor	Contractor Services	Capital	All Other Departments	[redacted]	[redacted]	13,723	[redacted]	-	-	[redacted]								
AMI Installation		Contractor Labor	Contractor Services	Capital	All Other Departments	[redacted]	[redacted]	1,452,132	[redacted]	-	-	[redacted]								
Retirement of SSN Network devices		Contractor Labor	Contractor Services	Capital	All Other Departments	[redacted]	[redacted]	2,400	[redacted]	-	-	[redacted]								
TBD		Contractor Labor	Contractor Services	Capital	All Other Departments	$ 100.00	$ 100.00	-	-	-	-	-								
TBD		Contractor Labor	Contractor Services	Capital	All Other Departments	$ 100.00	$ 100.00	-	-	-	-	-								
TBD		Contractor Labor	Contractor Services	Capital	All Other Departments	$ 100.00	$ 100.00	-	-	-	-	-								
TBD		Contractor Labor	Contractor Services	Capital	All Other Departments	$ 100.00	$ 100.00	-	-	-	-	-								
Billing							$ **53.69**	**29,840**	**1,602,230**	**-**	**-**	**1,602,230**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Billing Analyst		Staff Augmentation Labor	Billing	Capital	All Other Departments	[redacted]	[redacted]	6,240	[redacted]	-	-	[redacted]								
Billing Analyst		Staff Augmentation Labor	Billing	Capital	All Other Departments	[redacted]	[redacted]	5,960	[redacted]	-	-	[redacted]								
Billing Analyst		Staff Augmentation Labor	Billing	Capital	All Other Departments	[redacted]	[redacted]	5,920	[redacted]	-	-	[redacted]								
Billing Analyst		Internal Labor	Billing	Capital	All Other Departments	$ 44.68	$ 74.87	5,720	428,234	-	-	428,234								
Billing Analyst - Lead		Internal Labor	Billing	Capital	All Other Departments	$ 44.68	$ 74.87	6,000	449,196	-	-	449,196								
TBD		Internal Labor	Billing	Capital	All Other Departments	$ 44.68	$ 74.87	-	-	-	-	-								
TBD		Internal Labor	Billing	Capital	All Other Departments	$ 44.68	$ 74.87	-	-	-	-	-								
TBD		Internal Labor	Billing	Capital	All Other Departments	$ 44.68	$ 74.87	-	-	-	-	-								
TBD		Internal Labor	Billing	Capital	All Other Departments	$ 44.68	$ 74.87	-	-	-	-	-								
TBD		Internal Labor	Billing	Capital	All Other Departments	$ 44.68	$ 74.87	-	-	-	-	-								
Grand Total - All Labor Classifications							$ **32.15**	**1,863,942**	**59,933,742**	**-**	**-**	**59,933,742**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

FTE's Per Month (Rounded Up) **FTE's Per Month (Rounded Up)**

Labor Classification		Labor Class (Internal, Staff Aug., Contract)		Capital / O&M	IT&T ("IT&T) and Business ("All Other Departments")		Average Fully Burdened Wage Rate	Estimated Hours	Estimated Labor $	Estimated Expenses	Financial View Adder	Total Estimated Labor & Expenses	Jul-16	Aug-16	Sep-16	Oct-16	Nov-16	Dec-16	Jan-17	Feb-17
Internal Labor		Internal Labor		Capital	IT&T		82.92	2,708	224,559	-	-	224,559	-	-	-	-	-	-	-	-
Internal Labor		Internal Labor		Capital	All Other Departments		86.96	304,395	26,470,913	-	-	26,470,913	-	-	-	-	-	-	-	-
Internal Labor		Internal Labor		O&M	IT&T		0	-	-	-	-	-	-	-	-	-	-	-	-	-
Internal Labor		Internal Labor		O&M	All Other Departments		0	-	-	-	-	-	-	-	-	-	-	-	-	-
Staff Augmentation Labor		Staff Augmentation Labor		Capital	IT&T		0	-	-	-	-	-	-	-	-	-	-	-	-	-
Staff Augmentation Labor		Staff Augmentation Labor		Capital	All Other Departments		53.45	75,624	4,042,192	-	-	4,042,192	-	-	-	-	-	-	-	-
Staff Augmentation Labor		Staff Augmentation Labor		O&M	IT&T		0	-	-	-	-	-	-	-	-	-	-	-	-	-
Staff Augmentation Labor		Staff Augmentation Labor		O&M	All Other Departments		0	-	-	-	-	-	-	-	-	-	-	-	-	-
Contractor Labor		Contractor Labor		Capital	IT&T		0	-	-	-	-	-	-	-	-	-	-	-	-	-
Contractor Labor		Contractor Labor		Capital	All Other Departments		19.71	1,481,215	29,196,078	-	-	29,196,078	-	-	-	-	-	-	-	-
Contractor Labor		Contractor Labor		O&M	IT&T		0	-	-	-	-	-	-	-	-	-	-	-	-	-
Contractor Labor		Contractor Labor		O&M	All Other Departments		0	-	-	-	-	-	-	-	-	-	-	-	-	-
Grand Total - All Labor Classifications							**32.15**	**1,863,942**	**59,933,742**	**-**	**-**	**59,933,742**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Labor $ - Cash Flow by Month, by Organization							**40.18**	**2,216,829**	**89,069,176**	**-**	**-**	**89,069,176**	-	-	-	-	-	-	-	-
Project Management							75.07	134,904	10,127,333	-	-	10,127,333	-	-	-	-	-	-	-	-
Project Management							75.07	134,904	10,127,333	-	-	10,127,333	-	-	-	-	-	-	-	-
Field Services							87.25	215,275	18,783,542	-	-	18,783,542	-	-	-	-	-	-	-	-
Field Services							87.25	215,275	18,783,542	-	-	18,783,542	-	-	-	-	-	-	-	-
Telecom							82.92	2,708	224,559	-	-	224,559	-	-	-	-	-	-	-	-
Telecom							82.92	2,708	224,559	-	-	224,559	-	-	-	-	-	-	-	-
Contractor Services							19.71	1,481,215	29,196,078	-	-	29,196,078	-	-	-	-	-	-	-	-
Billing							53.69	29,840	1,602,230	-	-	1,602,230	-	-	-	-	-	-	-	-

Summary of Labor $ Cash Flow "by Year"					Total		1-Jan-16 31-Dec-16	1-Jan-17 31-Dec-17	1-Jan-18 31-Dec-18	1-Jan-19 31-Dec-19	1-Jan-20 31-Dec-20	1-Jan-21 31-Dec-21	1-Jan-22 31-Dec-22	1-Jan-23 31-Dec-23	1-Jan-24 31-Dec-24	1-Jan-25 31-Dec-25	1-Jan-26 31-Dec-26	1-Jan-27 31-Dec-27
Project Management					10,127,365		-	799,463	2,901,902	3,062,658	2,908,811	454,530	-	-	-	-	-	-
Project Management					10,127,365		-	799,463	2,901,902	3,062,658	2,908,811	454,530	-	-	-	-	-	-
Field Services					18,783,542		-	128,276	5,160,851	6,838,414	6,020,797	635,204	-	-	-	-	-	-
Field Services					18,783,542		-	128,276	5,160,851	6,838,414	6,020,797	635,204	-	-	-	-	-	-
Telecom					#VALUE!		-	74,974	#VALUE!	#VALUE!	#VALUE!	4,371	-	-	-	-	-	-
Telecom					#VALUE!		-	74,974	#VALUE!	#VALUE!	#VALUE!	4,371	-	-	-	-	-	-
Contractor Services					29,196,056		-	-	7,405,582	10,688,126	10,811,948	290,400	-	-	-	-	-	-
Billing					1,602,230		-	-	481,128	517,886	517,886	85,330	-	-	-	-	-	-
Grand Total - All Labor Classifications					#VALUE!		-	2,005,427	#VALUE!	#VALUE!	#VALUE!	2,563,941	-	-	-	-	-	-

EXHIBIT E

APPENDIX C

Telecom	-	-	145	145	126	90	90	90	90	124	124	46	49	49	49	41	81	81	49	49	49	49	49	49	49	49	49	49	45	45
Wireless Architecture	-	-	40	40	40	-	-																							
Data Network Architecture	-	-	40	40	40		-																							
Radio Engineering - EDX Modeling	-	-	10	10	6	80	80	80	80	80	80	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Radio Engineering - CGR Provisioning	-	-	10	10	-				-	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
Gnd Telecom Support - CGR Troubleshooting	-	-	-	-	-				-	-	-	-	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Radio Engineering - SSN Troubleshooting	-	-	-		-				-	-	-	-				-	40	40	8	8	8	8	8	3	3	8	8	8	4	4
Cellular Activation	-	-	5	5	-			-	-	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Project Manager - Telecom	-	-	40	40	40	10	10	10	10	10	10	10	10	10	10	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Telecom	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Contractor Services	-	-	-	-	-	-	-	-	-	-	255	160	16,077	30,114	36,664	41,307	42,252	45,563	44,618	48,398	44,521	41,306	44,849	42,268	44,849	45,795	46,267	43,903	47,686	46,740
Account Manager	-	-			-		-	-	-	-	40	40	40	40	40	40	40	40	40	40	40	40	80	80	80	80	80	80	80	80
Head End Specialist	-	-	-	-	-			-	-	-	120	120	120	120	120	120	120	120	120	120	120	120	160	160	160	160	160	160	160	160
Head End Specialist	-	-	-					-	-	-	-	-			-	-	-	-				-	160	160	160	160	160	160	160	160
Safety	-	-	-	-				-	-	-	2		44	76	90	531	543	586	574	620	571	530	565	531	565	578	583	553	601	589
AMI Installation	-	-	-	-	-	-		-	-	-	93	-	15,873	29,878	36,414	40,616	41,549	44,817	43,884	47,618	43,790	40,616	43,884	41,337	43,834	44,817	45,284	42,950	46,685	45,751
Retirement of SSN Network devices	-						-	-																						
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Billing	-	-	-	-	-	-	-	-	-	-	320	640	800	800	800	800	800	800	800	800	800	800	800	800	800	800	800	800	800	800
Billing Analyst	-	-		-	-	-	-	-	-	-	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
Billing Analyst	-	-			-	-	-	-				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
Billing Analyst	-	-			-	-	-	-	-			160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
Billing Analyst	-	-	-	-	-	-	-	-	-	-	-	-	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
Billing Analyst - Lead	-	-	-	-	-	-	-	-	-	-	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Grand Total - All Labor Classifications	-	758	908	908	1,078	1,311	1,546	1,549	1,706	2,218	4,211	5,235	23,021	38,513	45,732	51,498	52,771	56,425	55,309	59,493	55,214	51,674	55,535	52,677	55,669	56,771	57,324	54,718	58,870	57,843
FTE's Per Month (Rounded Up)	-	5	6	6	7	8	10	9	11	15	24	33	138	230	260	307	315	307	364	324	346	340	316	330	348	323	326	342	335	329

Labor Classification	Mar-17	Apr-17	May-17	Jun-17	Jul-17	Aug-17	Sep-17	Oct-17	Nov-17	Dec-17	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19	Jul-19	Aug-19
Internal Labor	-	-	145	145	126	90	90	90	90	124	124	46	49	49	49	41	81	81	49	49	49	49	49	49	49	49	49	49	45	45
Internal Labor	-	710	715	715	872	1,141	1,216	1,219	1,216	1,374	2,271	3,149	5,015	6,551	7,219	8,349	8,438	8,781	8,642	9,045	8,644	8,319	8,636	8,359	8,651	8,807	8,848	8,605	8,980	8,898
Internal Labor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Internal Labor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Staff Augmentation Labor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Staff Augmentation Labor	-	48	48	48	80	80	240	240	400	720	1,560	1,880	1,880	1,800	1,800	1,800	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,120	2,120	2,160	2,160	2,160	2,160
Staff Augmentation Labor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Staff Augmentation Labor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Contractor Labor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Contractor Labor	-	-	-	-	-	-	-	-	-	-	255	160	16,077	30,114	36,664	41,307	42,252	45,563	44,618	48,398	44,521	41,306	44,849	42,268	44,849	45,795	46,267	43,903	47,686	46,740
Contractor Labor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Contractor Labor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Grand Total - All Labor Classifications	-	758	908	908	1,078	1,311	1,546	1,549	1,706	2,218	4,211	5,235	23,021	38,513	45,732	51,498	52,771	56,425	55,309	59,493	55,214	51,674	55,535	52,677	55,669	56,771	57,324	54,718	58,870	57,843

Labor $ - Cash Flow by Month, by Organization	-	132,951	160,257	160,257	185,622	230,046	266,656	267,729	276,256	325,653	583,027	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
Project Management	-	66,476	67,280	67,280	81,538	82,342	100,647	101,184	105,447	127,269	190,601	245,042	246,587	246,353	247,664	246,821	246,587	248,741	244,667	248,507	245,900	244,433	253,653	251,265	251,499	253,653	253,419	251,890	253,185	253,887
Project Management	-	66,476	67,280	67,280	81,538	82,342	100,647	101,184	105,447	127,269	190,601	245,042	246,587	246,353	247,664	246,821	246,587	248,741	244,667	248,507	245,900	244,433	253,653	251,265	251,499	253,653	253,419	251,890	253,185	253,887
Field Services	-	-	-	-	-	25,655	25,655	25,655	25,655	25,655	65,046	78,778	246,145	382,203	441,708	531,979	550,962	578,757	570,774	602,095	569,638	542,765	553,628	531,912	563,914	575,582	581,645	561,908	593,352	585,460
Field Services	-	-	-	-	-	25,655	25,655	25,655	25,655	25,655	65,046	78,778	246,145	382,203	441,708	531,979	550,962	578,757	570,774	602,095	569,638	542,765	553,628	531,912	563,914	575,582	581,645	561,908	593,352	585,460
Telecom	-	-	12,848	12,848	11,273	7,026	7,026	7,026	7,026	9,902	9,902	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
Telecom	-	-	12,848	12,848	11,273	7,026	7,026	7,026	7,026	9,902	9,902	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
Contractor Services	-	-	-	-	-	-	-	-	-	-	33,550	31,800	315,526	565,550	682,208	776,643	793,748	853,685	836,580	904,938	834,763	776,593	883,184	836,440	883,184	900,289	908,826	866,061	934,486	917,363
Billing	-	-	-	-	-	-	-	-	-	-	18,379	31,179	43,157	43,157	43,157	43,157	43,157	43,157	43,157	43,157	43,157	43,157	43,157	43,157	43,157	43,157	43,157	43,157	43,157	43,157

Summary of Labor $ Cash Flow "by Year"
Project Management
Project Management
Field Services
Field Services
Telecom
Telecom
Contractor Services
Billing
Grand Total - All Labor Classifications

EXHIBIT E

APPENDIX C

Telecom	**45**	**45**	**45**	**45**	**45**	**45**	**45**	**45**	**45**	**45**	**45**	**45**	**45**	**45**	**11**	**11**	**11**	**9**	**9**	**9**	**9**	**9**	**-**	**-**	**-**	**-**	**-**	**-**
Wireless Architecture																												
Data Network Architecture																												
Radio Engineering - EDX Modeling	2	2	2	2	2	2	2	2	2	2	2	2	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Radio Engineering - CGR Provisioning	24	24	24	24	24	24	24	24	24	24	24	24	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Grid Telecom Support - CGR Troubleshooting	3	3	3	3	3	3	3	3	3	3	3	3	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Radio Engineering - SSN Troubleshooting	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	-	-	-	-	-	-
Cellular Activation	10	10	10	10	10	10	10	10	10	10	10	10	10	10	5	5	5	5	5	5	5	5	-	-	-	-	-	-
Project Manager - Telecom	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	-	-	-	-	-	-	-	-	-	-	-
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Telecom	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Contractor Services	**45,795**	**48,157**	**43,903**	**42,957**	**47,886**	**46,940**	**50,723**	**52,614**	**47,496**	**52,899**	**53,820**	**51,486**	**49,619**	**44,950**	**35,147**	**11,789**	**240**	**240**	**240**	**240**	**240**	**240**	**-**	**-**	**-**	**-**	**-**	**-**
Account Manager	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	-	-	-	-	-	-
Head End Specialist	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	-	-	-	-	-	-
Head End Specialist	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	-	-	-	-	-	-	-	-	-	-	-	-
Safety	578	606	553	541	601	589	637	661	211	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AMI Installation	44,817	47,151	42,950	42,016	46,685	45,751	49,486	51,353	46,685	52,287	53,220	50,886	49,019	44,350	34,547	11,189	-	-	-	-	-	-	-	-	-	-	-	-
Retirement of SSN Network devices	-			-	200	200	200	200	200	200	200	200	200	200	200	200	-	-	-	-	-	-	-	-	-	-	-	-
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Billing	**800**	**800**	**800**	**800**	**800**	**800**	**800**	**800**	**800**	**800**	**800**	**800**	**800**	**800**	**800**	**800**	**800**	**400**	**200**	**160**	**80**	**40**	**-**	**-**	**-**	**-**	**-**	**-**
Billing Analyst	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	80	80	80	40	40	-	-	-	-	-	-
Billing Analyst	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	80	40	40	40	-	-	-	-	-	-	-
Billing Analyst	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	80	40	40	-	-	-	-	-	-	-	-
Billing Analyst	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	80	40	-	-	-	-	-	-	-	-	-
Billing Analyst - Lead	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	80	-	-	-	-	-	-	-	-	-	-
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Grand Total - All Labor Classifications	**56,784**	**59,403**	**54,821**	**53,789**	**59,070**	**58,003**	**62,161**	**64,252**	**57,871**	**63,302**	**64,266**	**61,596**	**59,273**	**53,467**	**42,526**	**17,551**	**4,251**	**3,529**	**2,869**	**2,413**	**1,529**	**733**	**-**	**-**	**-**	**-**	**-**	**-**

FTE's Per Month (Rounded Up)	**355**	**323**	**361**	**337**	**336**	**363**	**371**	**366**	**362**	**360**	**366**	**367**	**353**	**304**	**280**	**105**	**27**	**23**	**17**	**14**	**10**	**5**	**-**	**-**	**-**	**-**	**-**	**-**

Labor Classification	Sep-19	Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20	Apr-20	May-20	Jun-20	Jul-20	Aug-20	Sep-20	Oct-20	Nov-20	Dec-20	Jan-21	Feb-21	Mar-21	Apr-21	May-21	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21
Internal Labor	45	45	45	45	45	45	45	45	45	45	45	45	45	45	11	11	11	9	9	9	9	9	-	-	-	-	-	-
Internal Labor	8,785	9,040	8,713	8,627	8,980	8,858	9,233	9,433	8,169	8,198	8,241	7,985	7,769	7,032	6,168	4,551	2,800	2,640	2,380	1,924	1,120	364	-	-	-	-	-	-
Internal Labor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Internal Labor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Staff Augmentation Labor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Staff Augmentation Labor	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,080	1,840	1,440	1,200	1,200	1,200	640	240	240	160	120	-	-	-	-	-	-
Staff Augmentation Labor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Staff Augmentation Labor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Contractor Labor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Contractor Labor	45,795	48,157	43,903	42,957	47,886	46,940	50,723	52,614	47,496	52,899	53,820	51,486	49,619	44,950	35,147	11,789	240	240	240	240	240	240	-	-	-	-	-	-
Contractor Labor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Contractor Labor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Grand Total - All Labor Classifications	**56,784**	**59,403**	**54,821**	**53,789**	**59,070**	**58,003**	**62,161**	**64,252**	**57,871**	**63,302**	**64,266**	**61,596**	**59,273**	**53,467**	**42,526**	**17,551**	**4,251**	**3,529**	**2,869**	**2,413**	**1,529**	**733**	**-**	**-**	**-**	**-**	**-**	**-**

Labor $ - Cash Flow by Month, by Organization	**#VALUE!**	**#VALUE!**	**#VALUE!**	**#VALUE!**	**#VALUE!**	**#VALUE!**	**#VALUE!**	**#VALUE!**	**#VALUE!**	**2,651,830**	**2,675,266**	**2,587,363**	**2,500,537**	**2,248,613**	**1,882,378**	**1,174,673**	**637,497**	**580,406**	**506,927**	**428,188**	**276,700**	**134,224**	**-**	**-**	**-**	**-**	**-**	**-**
Project Management	251,733	254,496	266,763	267,215	269,837	267,215	268,292	269,837	267,215	269,603	269,603	261,385	246,575	191,998	161,849	165,400	93,153	93,153	94,850	86,467	56,556	30,351	-	-	-	-	-	-
Project Management	251,733	254,496	266,763	267,215	269,837	267,215	268,292	269,837	267,215	269,603	269,603	261,385	246,575	191,998	161,849	165,400	93,153	93,153	94,850	86,467	56,556	30,351	-	-	-	-	-	-
Field Services	577,782	597,306	561,908	554,016	574,057	566,165	597,823	613,698	515,337	517,251	520,961	505,942	493,908	463,960	400,898	250,797	178,958	161,358	129,014	99,525	55,292	11,058	-	-	-	-	-	-
Field Services	577,782	597,306	561,908	554,016	574,057	566,165	597,823	613,698	515,337	517,251	520,961	505,942	493,908	463,960	400,898	250,797	178,958	161,358	129,014	99,525	55,292	11,058	-	-	-	-	-	-
Telecom	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	3,763	3,763	3,763	3,763	3,763	859	859	859	703	703	703	703	703	-	-	-	-	-	-
Telecom	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	3,763	3,763	3,763	3,763	3,763	859	859	859	703	703	703	703	703	-	-	-	-	-	-
Contractor Services	900,289	943,005	866,061	848,938	954,486	937,363	1,005,837	1,040,065	936,963	1,027,439	1,043,455	1,002,027	968,887	886,013	712,009	297,405	48,400	48,400	48,400	48,400	48,400	48,400	-	-	-	-	-	-
Billing	43,157	43,157	43,157	43,157	43,157	43,157	43,157	43,157	43,157	43,157	43,157	43,157	43,157	43,157	43,157	43,157	43,157	21,579	9,395	6,400	3,200	1,600	-	-	-	-	-	-

Summary of Labor $ Cash Flow "by Year"
Project Management
Project Management
Field Services
Field Services
Telecom
Telecom
Contractor Services
Billing
Grand Total - All Labor Classifications

Labor Burden Rates and Factors Assumptions

[illegible] **Internal Hourly Rate Factor** *(see 'Labor Loader Rates' tab to assess project for proper burdens)*			
Internal Labor Loaders Factor (Unburdened)	**1.00**		**Basis of Estimated Rates Used**
Fringe	0 21	*21 08%*	Type basis of rate choice here (defaulted to 'Service Company' rate - may need to be higher/lower based on project jurisdiction and/or actuals guidance from Finance)
Incentive	0 11	*10 50%*	Type basis of rate choice here (defaulted to standard assumption from Finance in Jan 2014 - may need to be higher/lower based on actuals guidance from Finance)
Payroll Tax	0 10	*7 65%*	Type basis of rate choice here (defaulted to standard assumption from Finance in Jan 2014 - may need to be higher/lower based on actuals guidance from Finance)
Serv. Co. Loader	0.25	*25 32%*	Type basis of rate choice here (defaulted to 'Service Company' actuals rate - may need to be higher/lower based on new guidance from Finance)
Internal Labor Loaders Factor (Burdened)	[illegible]		

T&D/E&TS Internal Hourly Rate Factor *(see 'Labor Loader Rates' tab to assess project for proper burdens)*			
Internal Labor Loaders Factor (Unburdened)	**1.00**		**Basis of Estimated Rates Used**
Fringe	0.15	*14 92%*	Type basis of rate choice here (defaulted to 'DE Florida' rate - may need to be higher/lower based on project jurisdiction and/or actuals guidance from Finance)
Incentive	0.11	*10 50%*	Type basis of rate choice here (defaulted to standard assumption from Finance in Jan 2014 - may need to be higher/lower based on actuals guidance from Finance)
Payroll Tax	0 10	*7 65%*	Type basis of rate choice here (defaulted to standard assumption from Finance in Jan 2014 - may need to be higher/lower based on actuals guidance from Finance)
Utility Loader	0 45	*45 00%*	Type basis of rate choice here (defaulted to flat planning rate for 'Jurisdictional Utility' resource - may need to be higher/lower based on new guidance from Finance)
Internal Labor Loaders Factor (Burdened)	[illegible]		

[illegible] **Internal Hourly Rate Factor** *(see 'Labor Loader Rates' tab to assess project for proper burdens)*			
Internal Labor Loaders Factor (Unburdened)	**1.00**		**Basis of Estimated Rates Used**
Fringe	0.15	*14 92%*	Type basis of rate choice here (defaulted to 'DE Florida' rate - may need to be higher/lower based on project jurisdiction and/or actuals guidance from Finance)
Incentive	0.11	*10 50%*	Type basis of rate choice here (defaulted to standard assumption from Finance in Jan 2014 - may need to be higher/lower based on actuals guidance from Finance)
Payroll Tax	0 10	*7 65%*	Type basis of rate choice here (defaulted to standard assumption from Finance in Jan 2014 - may need to be higher/lower based on actuals guidance from Finance)
Affiliate Loader	0 55	*55 00%*	Type basis of rate choice here (defaulted to 'Affiliate Loader' rate - may need to be higher/lower based on actuals or guidance from Finance)
Internal Labor Loaders Factor (Burdened)	[illegible]		

Staff Augmentation Labor Hourly Rates (no burdens)	**(see various rates above)**
Contractor Labor Hourly Rates (no burdens)	**(see various rates above)**

DUKE ENERGY®

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Grid Solutions
Duke Energy Progress
DEP
AMR to AMI Deployment

Class 2 - (5% to 15%)
COST ESTIMATE DETAIL

Issue Date: 05/17/17
Revision No:
IPRS No: IPRS #317
Estimate No: Est #336

Work Flow Phase WBS # / ID Task # / ID	Line Item Revision Number	DESCRIPTION	Capital/ O&M	IT&T/All Other Departments	UoM	UNIT QTY	WH UNIT	RATE	MATL UNIT	EQUIP UNIT	SUB UNIT	TOTAL WORK HOURS	LABOR $	MATERIAL $	EQUIPMENT $	SUBCONT. $	TOTAL	*Spent to Date - For Reference Only*	*Contingency Percentage*	*Contingency Amount*
SUBSERV		Subcontractor Support, Professional Services, etc.										1,481,215	29,196,078			700,000	29,896,078		10.49%	3,135,918
		Itron Professional Services																		
3400.00		Account Manager	Capital	All Other Departments	Hrs	2,880	1.00	[redacted]				2,880	[redacted]				[redacted]			
6670.00		Head End Specialist	Capital	All Other Departments	Hrs	6,240	1.00					6,240								
6670.00		Head End Specialist	Capital	All Other Departments	Hrs	3,840	1.00					3,840								
		Itron Travel																		
		Account Manager	Capital	All Other Departments	Ea	100					1750.00					175,000	175,000			
		Head End Specialist	Capital	All Other Departments	Ea	150					1750.00					262,500	262,500			
		Head End Specialist	Capital	All Other Departments	Ea	150					1750.00					262,500	262,500			
		Safety																		
		Flaggers, Vegetation Management, Police protection	Capital	All Other Departments	Hrs	13,723	1.00	45.00				13,723	617,535				617,535		5.00%	30,877
		Added 5% contingency for future rate discussions																		
		Meter Installation																		
		Includes $0.91 is for recycling	Capital	All Other Departments	Hrs	1,452,132	1.00	[redacted]				1,452,132	[redacted]				[redacted]		12.00%	[redacted]
		Added 5% contingency for future rate discussions																		
		Retirement of SSN Network devices	Capital	All Other Departments	Ea	2,400	1.00	100.00				2,400	240,000				240,000		5.00%	12,000
		NOTE:																		
		Apply Working Stock to materials that require it (see 'Material Loader Rates' for guidance)																		
		For Material / Equipment $ - Estimated 'Stores Loading', 'Sales/Use Tax', 'Freight', and 'Escalation' should be included in Columns K-L also																		
		For Subcontract / Services $ - Estimated 'Escalation' should be included in Columns M also																		
		For Labor $ - Fully burdened Labor $ (with Fringe, Incentive, Payroll Tax, Loader, and Escalation) should be included in Column J also																		
		For Labor $ - Estimated 'Meals & Travel' dollars should summed into Column J as well																		
		Estimating Contingency percentage should be entered in Column U																		

DUKE ENERGY®

Grid Solutions
Duke Energy Progress
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AMR to AMI Deployment

Class 2 - (5% to 15%)
COST ESTIMATE DETAIL

Issue Date: 05/17/17
Revision No:
IPRS No: IPRS #317
Estimate No: Est #336

Work Flow Phase WBS # / ID Task # / ID	Line Item Revision Number	DESCRIPTION	Capital/ O&M	IT&T/All Other Departments	UoM	UNIT QTY	WH UNIT	RATE	MATL UNIT	EQUIP UNIT	SUB UNIT	TOTAL WORK HOURS	LABOR $	MATERIAL $	EQUIPMENT $	SUBCONT. $	TOTAL	*Spent to Date - For Reference Only*	*Contingency Percentage*	*Contingency Amount*
OH ALLOC		**Grid Solutions Overhead Allocated Costs**											**2,471,519**				**2,471,519**	**3,513**	**4.99%**	**123,400**
		Grid Solutions POOL Allocation	Capital	All Other Departments	PCT	61,700,162	1.00	0.04					2,468,006				2,468,006		*5.00%*	*123,400*
		Actuals	Capital	All Other Departments	LS	1	1.00	3512.63					3,513				3,513	*3,513*		

NOTE:
GS Pool Allocation rate is based on curent GS Finance guidance.
GS Pool Allocation is applied to total labor cost (Internal, Staff Augmentation, and Contractor).
OH Allocation should be entered as Labor to ensure it is properly reflected on the Summaries.

Grid Solutions
Duke Energy Progress
DEP
AMR to AMI Deployment

Class 2 - (5% to 15%)
COST ESTIMATE DETAIL

Issue Date: 05/17/17
Revision No:
IPRS No: IPRS #317
Estimate No: Est #336

Work Flow Phase WBS # / ID Task # / ID	Line Item Revision Number	DESCRIPTION	Capital/ O&M	IT&T/All Other Departments	UoM	UNIT QTY	WH UNIT	RATE	MATL UNIT	EQUIP UNIT	SUB UNIT	TOTAL WORK HOURS	LABOR $	MATERIAL $	EQUIPMENT $	SUBCONT. $	TOTAL	*Spent to Date - For Reference Only*	*Contingency Percentage*	*Contingency Amount*
RISK EMV		**Risk EMV Contingency**													**3,670,524**		**3,670,524**			
Risk ID																				
18		Communications Equipment Requirements Exceed Plan	Capital	All Other Departments	LS	1				878823.00					878,823		878,823			
16		Installation Vendor Underbid	Capital	All Other Departments	LS	1				716926.00					716,926		716,926			
12		Installation Vendor Pricing Bid is not similar to Indiana RFQ	Capital	All Other Departments	LS	1				318634.00					318,634		318,634			
26		Customer Meter Location Inaccuracies	Capital	All Other Departments	LS	1				289560.00					289,560		289,560			
19		Increase in Required 4G Cellular (Direct Connect) Meters	Capital	All Other Departments	LS	1				261375.00					261,375		261,375			
1		Resource Constraint (Meter Installation Vendors)	Capital	All Other Departments	LS	1				159317.00					159,317		159,317			
23		Delay in CIM to MDM Project	Capital	All Other Departments	LS	1				158400.00					158,400		158,400			
6		Resource Constraint (Availability of Skilled Mitigation Resources)	Capital	All Other Departments	LS	1				155925.00					155,925		155,925			
13		Non-scalable Range Extender for Pads (Processes & Permissions)	Capital	All Other Departments	LS	1				123077.00					123,077		123,077			
20		Can't Locate Duke Owned Pole for Communications Devices	Capital	All Other Departments	LS	1				123077.00					123,077		123,077			
		Risk register delta	Capital	All Other Departments	LS	1				485410.00					485,410		485,410			
		Total 'Risk EMV' should be detailed under Columns J-M.																		
		IMPORTANT:																		
		If amount of highest single triggered-risk item on Risk Register is higher (than sum of 'Risk EMV' list) use that amount here instead.																		

REDACTED

User Notes:
1. This worksheet is not linked to any other worksheet, except for the date information which comes from the **Title Block** worksheet.
2. All data fields that are "blue" font, must be keyed in manually. All other fields are formulas.
3. Please determine your Cash Flow Categories in such a way as you would like to report out for your project. These are user defined fields.
4. Formulas in cells H26:M36 are "Array" formulas. Please do not edit unless you have a good understanding of Array formulas.

Cash Flow Categories	Cost Category	Capital / O&M	IT/Telecom/All Other Departments	Total	Jul-16	Aug-16	Sep-16	Oct-16	Nov-16	Dec-16	Jan-17	Feb-17	Mar-17	Apr-17	May-17	Jun-17	Jul-17	Aug-17	Sep-17	Oct-17	Nov-17	Dec-17	Jan-18
					2016	2016	2016	2016	2016	2016	2017	2017	2017	2017	2017	2017	2017	2017	2017	2017	2017	2017	2018
Itron Meters	Materials & Mat Burdens	Capital	All Other Departments	[redacted]	-	-	-	-	-	-	-	-	-			-	-	[redacted]					
Connected Grid Routers (CGR)	Materials & Mat Burdens	Capital	All Other Departments		-	-	-	-	-	-	-	-	-		-	-							
Range Extenders (RFRE)	Materials & Mat Burdens	Capital	All Other Departments		-	-	-	-	-	-	-	-	-		-								
	Internal Labor	Capital	All Other Departments	-	-	-	-	-	-	-	-	-	-	-	-			-	-			-	-
Project Management	Internal Labor	Capital	All Other Departments	7,978,455	6,988	7,766	8,948	4,729	-	446	-	-	-	57,556	57,944	57,944	70,648	71,037	77,130	77,389	77,130	89,903	131,250
Project Management	Staff Augmentation Labor	Capital	All Other Departments	2,194,807	3,503	7,097	4,641	1,774	-	-	-	-	-	2,842	2,842	2,842	4,736	4,736	14,209	14,209	23,682	42,628	61,573
Field Services	Internal Labor	Capital	All Other Departments	17,643,942	-	-	-	-	-	-	-	-	-	-			-	23,942	23,942	23,942	23,942	23,942	44,564
Field Services	Staff Augmentation Labor	Capital	All Other Departments	1,139,600	-	-	-	-	-	-	-	-	-			-	-			-	-		19,800
Telecom	Internal Labor	Capital	Telecom	224,559	-	-	-	-	-	-	-	-	-	-	12,024	12,024	10,448	7,463	7,463	7,463	7,463	10,283	10,283
Telecom	Staff Augmentation Labor	Capital	Telecom	-	-	-	-	-	-	-	-	-	-		-		-			-	-		-
Contractor Services	Contractor Labor	Capital	All Other Departments	29,196,068	2,275	(746)	(1,529)	-	-	-	-	-	-	-	-			-	-	-			5,030
Billing	Internal Labor	Capital	All Other Departments	724,800	-	-	-	-	-	-	-	-	-				-	-	-			-	6,400
Billing	Staff Augmentation Labor	Capital	All Other Departments	877,430	-	-	-	-	-	-	-	-	-	-	-			-	-		-	-	11,979
Escalation	Other	Capital	All Other Departments	-	-	-	-	-	-	-	-	-	-	-	-			-	-			-	-
Internal	Internal Labor	Capital	All Other Departments	1,521,374	-	-	-	-	-	-	-	-	-	-	-			-	-			-	5,102
Staff Augmentation	Staff Augmentation Labor	Capital	All Other Departments	236,901	-	-	-	-	-	-	-	-	-	-	-			-	-	-	-	-	2,614
Internal	Internal Labor	Capital	Telecom	8,138	-	-	-	-	-	-	-	-	-	-	-			-	-	-			288
Staff Augmentation	Staff Augmentation Labor	Capital	Telecom	-	-	-	-	-	-	-	-	-	-			-	-		-	-	-		-
Expenses	Meals/Travel/Lodging/Fleet	Capital	All Other Departments	-	-	-	-	-	-	-	-	-	-			-	-			-	-		-
Expenses	Meals/Travel/Lodging/Fleet	Capital	Telecom	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-		-
Itron Travel	Meals/Travel/Lodging/Fleet	Capital	All Other Departments	700,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				9,722
Optical Cables and Probes	Materials & Mat Burdens	O&M	All Other Departments	18,626	-	-	-	-	-	-	-	-	-	-	-			-	-			-	-
Risk EMV & Contingency - Estimate Uncertainty	Contingency	Capital	All Other Departments	15,188,003	-	-	-	-	-	-	-	-	-	-	-			-	-			500,000	
Grid Solutions POOL Allocation	PMO (Allocation)	Capital	All Other Departments	2,471,519	1,151	882	731	724	-	25	-	-	-	2,416	2,912	2,912	3,433	4,287	4,910	4,920	5,289	6,673	11,955
Grid Solutions POOL Allocation	PMO (Allocation)	O&M	All Other Departments	-	-	-	-	-	-	-	-	-	-	-	-			-	-			-	
Grand Total - All Cash Flow Categories				278,162,481	13,916	15,020	12,790	7,227	-	471	-	-	-	62,813	75,723	75,723	89,266	759,377	775,565	775,834	785,416	1,321,399	337,764

IPRS Format

Cost Category	Capital / O&M	IT&T / Business (All Other Departments)	Total	Jul-16	Aug-16	Sep-16	Oct-16	Nov-16	Dec-16	Jan-17	Feb-17	Mar-17	Apr-17	May-17	Jun-17	Jul-17	Aug-17	Sep-17	Oct-17	Nov-17	Dec-17	Jan-18
Internal Labor	Capital	IT&T	232,697	-	-	-	-	-	-	-	-	-	-	12,024	12,024	10,448	7,463	7,463	7,463	7,463	10,283	10,571
	Capital	All Other Departments	27,868,571	6,988	7,786	8,948	4,729	-	446	-	-	-	57,556	57,944	57,944	70,648	94,979	101,071	101,331	101,071	113,905	187,317
	O&M	IT&T	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	O&M	All Other Departments	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Staff Augmentation Labor	Capital	IT&T	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Capital	All Other Departments	4,448,738	3,503	7,097	4,641	1,774	-	-	-	-	-	2,842	2,842	2,842	4,736	4,736	14,209	14,209	23,682	42,628	95,965
	O&M	IT&T	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	O&M	All Other Departments	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Contractor Labor	Capital	IT&T	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Capital	All Other Departments	29,196,068	2,275	(746)	(1,529)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5,030
	O&M	IT&T	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	O&M	All Other Departments	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Materials & Mat Burdens	Capital	IT&T	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Capital	All Other Departments	198,038,259	-	-	-	-	-	-	-	-	-	-	-	-	-	647,911	647,911	647,911	647,911	647,911	17,204
	O&M	IT&T	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	O&M	All Other Departments	18,626	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Meals/Travel/Lodging/Fleet	Capital		700,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9,722
	O&M		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other	Capital	IT&T	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Capital	All Other Departments	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	O&M	IT&T	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	O&M	All Other Departments	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Contingency	Capital		15,188,003	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	500,000	-
	O&M		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PMO (Allocation)	Capital	All Other Departments	2,471,519	1,151	882	731	724	-	25	-	-	-	2,416	2,912	2,912	3,433	4,287	4,910	4,920	5,289	6,673	11,955
	O&M	All Other Departments	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PMO (Allocation)	Capital	IT&T	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	O&M	IT&T	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AFUDC	Capital		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
IPRS Grand Total			278,162,481	**13,916**	**15,020**	**12,790**	**7,227**	**-**	**471**	**-**	**-**	**-**	**62,813**	**75,723**	**75,723**	**89,266**	**759,377**	**775,565**	**775,834**	**785,416**	**1,321,399**	**337,764**

EXHIBIT E

APPENDIX C

OFFICIAL COPY

Oct 02 2017

2018	2018	2018	2018	2018	2018	2018	2018	2018	2018	2018	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2020	2020	2020	2020	2020	2020	2020	2020	2020
Feb-18	Mar-18	Apr-18	May-18	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20	Apr-20	May-20	Jun-20	Jul-20	Aug-20	Sep-20
[redacted]																															
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
190,313	191,836	191,593	192,873	192,079	191,836	193,910	190,005	193,667	191,204	189,762	199,354	197,037	197,280	199,354	199,111	197,685	198,868	199,597	197,523	200,148	206,370	206,759	209,320	206,759	207,796	209,320	206,759	209,076	209,076	201,801	195,076
61,573	61,573	61,573	61,573	61,573	61,573	61,573	61,573	61,573	61,573	61,573	61,573	61,573	61,573	61,573	61,573	61,573	61,573	61,573	61,573	61,573	61,573	61,573	61,573	61,573	61,573	61,573	61,573	61,573	61,573	56,837	42,628
58,041	211,029	350,581	409,764	513,168	521,438	550,259	541,988	574,491	540,846	512,968	531,043	508,534	534,670	546,569	550,559	530,118	562,729	554,549	546,569	566,810	530,118	521,938	551,043	542,863	575,674	592,125	480,414	480,396	484,278	469,223	457,162
19,800	19,800	15,400	15,400	15,400	26,400	26,400	26,400	26,400	26,400	26,400	26,400	26,400	33,000	33,000	35,200	35,200	35,200	35,200	35,200	35,200	35,200	35,200	35,200	35,200	35,200	35,200	35,200	35,200	35,200	35,200	35,200
3,815	4,063	4,063	4,063	3,400	6,717	6,717	4,063	4,063	4,063	4,063	4,063	4,063	4,063	4,063	4,063	4,063	3,732	3,732	3,732	3,732	3,732	3,732	3,732	3,732	3,732	3,732	3,732	3,732	3,732	3,732	3,732
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3,154	316,892	593,572	722,684	814,204	832,833	898,094	879,465	953,976	877,547	814,182	884,022	833,146	884,022	902,651	911,964	865,373	939,926	921,278	902,651	949,220	865,373	846,725	943,868	925,220	999,794	1,037,071	936,193	1,042,689	1,060,841	1,014,835	978,035
19,200	19,200	19,200	19,200	19,200	19,200	19,200	19,200	19,200	19,200	19,200	19,200	19,200	19,200	19,200	19,200	19,200	19,200	19,200	19,200	19,200	19,200	19,200	19,200	19,200	19,200	19,200	19,200	19,200	19,200	19,200	19,200
11,979	23,957	23,957	23,957	23,957	23,957	23,957	23,957	23,957	23,957	23,957	23,957	23,957	23,957	23,957	23,957	23,957	23,957	23,957	23,957	23,957	23,957	23,957	23,957	23,957	23,957	23,957	23,957	23,957	23,957	23,957	23,957
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7,491	11,818	15,718	17,411	20,284	20,509	21,374	21,033	22,046	21,035	20,214	41,977	40,587	42,064	42,847	43,057	41,832	43,725	43,307	42,744	44,025	42,319	41,882	66,263	65,350	68,227	69,755	60,042	60,237	60,567	58,669	57,072
2,614	2,949	2,826	2,826	2,826	3,134	3,134	3,134	3,134	3,134	3,134	6,268	6,268	6,638	6,638	6,761	6,761	6,761	6,761	6,761	6,761	6,761	6,761	10,262	10,262	10,262	10,262	10,262	10,262	10,262	9,859	8,652
107	114	114	114	95	188	188	114	114	114	114	228	228	228	228	228	228	209	209	209	209	209	209	317	317	317	317	317	317	317	317	317
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9,722	9,722	9,722	9,722	9,722	9,722	9,722	9,722	9,722	9,722	9,722	19,444	19,444	19,444	19,444	19,444	19,444	19,444	19,444	19,444	19,444	19,444	19,444	19,444	19,444	19,444	19,444	19,444	19,444	19,444	19,444	19,444
-	18,626	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	2,500,000	-	-	-	-	-	-	-	-	-	-	-	2,500,000	-	-	-	-	-	-	-	-	-
15,123	34,529	51,144	58,795	66,647	68,311	72,192	70,837	75,305	70,763	67,023	71,923	68,840	72,268	73,603	74,227	71,440	75,835	74,775	73,605	76,433	71,792	70,717	76,989	75,777	80,229	82,500	73,506	77,866	78,760	75,745	72,841
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
402,931	3,082,780	5,365,096	6,433,318	7,357,269	7,528,990	8,079,688	7,916,002	8,535,190	7,891,464	9,861,626	7,910,769	7,477,163	7,919,723	8,082,900	8,163,152	7,769,732	8,392,449	8,236,414	8,082,941	8,472,037	7,778,907	#########	8,422,457	8,262,486	8,892,068	9,208,034	8,194,209	8,496,239	8,574,264	8,210,480	7,906,658

Feb-18	Mar-18	Apr-18	May-18	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20	Apr-20	May-20	Jun-20	Jul-20	Aug-20	Sep-20
3,921	4,177	4,177	4,177	3,495	6,905	6,905	4,177	4,177	4,177	4,177	4,291	4,291	4,291	4,291	4,291	4,291	3,941	3,941	3,941	3,941	3,941	3,941	4,049	4,049	4,049	4,049	4,049	4,049	4,049	4,049	4,049
275,045	433,883	577,092	639,248	744,731	752,983	784,743	772,227	809,404	772,284	742,144	791,575	765,358	793,215	807,970	811,927	788,835	824,522	816,654	806,036	830,184	798,007	789,779	845,825	834,172	870,897	890,399	766,416	768,910	773,121	748,893	728,511
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
95,965	108,279	103,756	103,756	103,756	115,064	115,064	115,064	115,064	115,064	115,064	118,198	118,198	125,168	125,168	127,491	127,491	127,491	127,491	127,491	127,491	127,491	127,491	130,992	130,992	130,992	130,992	130,992	130,992	130,992	125,853	110,436
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3,154	316,892	593,572	722,684	814,204	832,833	898,094	879,465	953,976	877,547	814,182	884,022	833,146	884,022	902,651	911,964	865,373	939,926	921,278	902,651	949,220	865,373	846,725	943,868	925,220	999,794	1,037,071	936,193	1,042,689	1,060,841	1,014,835	978,035
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	2,156,671	4,025,633	4,894,936	5,614,713	5,743,171	6,192,967	6,064,509	6,567,542	6,041,906	5,609,314	6,021,315	5,667,885	6,021,315	6,149,773	6,213,808	5,892,858	6,401,289	6,272,832	6,149,773	6,465,324	5,892,858	5,764,400	6,401,289	6,272,832	6,786,662	7,043,578	6,263,610	6,452,289	6,507,056	6,221,659	5,993,341
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	18,626	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9,722	9,722	9,722	9,722	9,722	9,722	9,722	9,722	9,722	9,722	9,722	19,444	19,444	19,444	19,444	19,444	19,444	19,444	19,444	19,444	19,444	19,444	19,444	19,444	19,444	19,444	19,444	19,444	19,444	19,444	19,444	19,444
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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-	-	-	-	-	-	-	-	-	-	2,500,000	-	-	-	-	-	-	-	-	-	-	-	2,500,000	-	-	-	-	-	-	-	-	-
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15,123	34,529	51,144	58,795	66,647	68,311	72,192	70,837	75,305	70,763	67,023	71,923	68,840	72,268	73,603	74,227	71,440	75,835	74,775	73,605	76,433	71,792	70,717	76,989	75,777	80,229	82,500	73,506	77,866	78,760	75,745	72,841
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
402,931	3,082,780	5,365,096	6,433,318	7,357,269	7,528,990	8,079,688	7,916,002	8,535,190	7,891,464	9,861,626	7,910,769	7,477,163	7,919,723	8,082,900	8,163,152	7,769,732	8,392,449	8,236,414	8,082,941	8,472,037	7,778,907	10,122,498	8,422,457	8,262,486	8,892,068	9,208,034	8,194,209	8,496,239	8,574,264	8,210,480	7,906,658

EXHIBIT E

APPENDIX C

2020	2020	2020	2021	2021	2021	2021	2021	2021	2021	2021	2021	2021	2021	2021
Oct-20	Nov-20	Dec-20	Jan-21	Feb-21	Mar-21	Apr-21	May-21	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21
[redacted]			-	-	-	-	-	-	-	-	-	-	-	-
			-	-	-	-	-	-	-	-	-	-	-	-
			-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
162,167	148,685	152,056	74,537	74,537	76,157	68,380	42,130	19,769	-	-	-	-	-	-
18,946	4,736	4,736	4,736	4,736	4,736	4,736	4,736	4,736	-	-	-	-	-	-
427,144	363,934	213,481	141,474	141,474	126,964	97,944	54,413	10,883	-	-	-	-	-	-
35,200	35,200	35,200	35,200	17,600	-	-	-	-	-	-	-	-	-	-
3,732	912	912	912	746	746	746	746	746	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
886,005	692,779	232,372	4,731	4,731	4,731	4,731	4,731	4,731	-	-	-	-	-	-
19,200	19,200	19,200	19,200	9,600	6,400	6,400	3,200	1,600	-	-	-	-	-	-
23,957	23,957	23,957	23,957	11,979	2,995	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
51,723	45,205	32,703	26,814	25,720	23,885	19,690	11,371	3,677	-	-	-	-	-	-
6,639	5,431	5,431	7,284	3,912	881	540	540	540	-	-	-	-	-	-
317	78	78	104	85	85	85	85	85	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19,444	19,444	19,444	19,444	19,444	19,444	19,444	19,444	19,444	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	2,500,000	-	-	-	-	-	7,188,003	-	-	-	-	-	-
65,401	53,605	28,805	13,558	11,805	9,903	8,130	4,878	1,871	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7,142,421	5,637,044	4,636,341	371,952	326,369	276,929	230,827	146,274	7,256,084	-	-	-	-	-	-

Yearly Totals for Escalation Calculations

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
-	-	47,090,538	64,987,569	65,468,177	-	0	0	0	0	0	0
-	3,239,555	4,702,754	5,933,785	2,726,626	-	0	0	0	0	0	0
-	-	1,135,273	1,992,076	761,905	-	0	0	0	0	0	0
-	-	-	-	-	-	0	0	0	0	0	0
28,898	636,741	2,240,325	2,399,089	2,317,892	355,509	0	0	0	0	0	0
17,015	112,726	738,877	738,877	558,894	28,418	0	0	0	0	0	0
-	119,709	4,829,138	6,484,206	5,637,736	573,153	0	0	0	0	0	0
-	-	264,000	400,400	422,400	52,800	0	0	0	0	0	0
-	74,632	59,374	46,769	39,140	4,644	0	0	0	0	0	0
-	-	-	-	-	-	0	0	0	0	0	0
-	-	7,711,633	10,706,351	10,749,701	28,384	0	0	0	0	0	0
-	-	217,600	230,400	230,400	46,400	0	0	0	0	0	0
-	-	263,528	287,486	287,486	38,930	0	0	0	0	0	0
-	-	-	-	-	-	0	0	0	0	0	0
-	-	204,038	510,367	695,812	111,157	0	0	0	0	0	0
-	-	35,459	79,899	107,846	13,697	0	0	0	0	0	0
-	-	1,662	2,619	3,327	529	0	0	0	0	0	0
-	-	-	-	-	-	0	0	0	0	0	0
-	-	-	-	-	-	0	0	0	0	0	0
-	-	-	-	-	-	0	0	0	0	0	0
-	-	116,667	233,333	233,333	116,667	0	0	0	0	0	0
-	-	18,626	-	-	-	0	0	0	0	0	0
-	500,000	2,500,000	2,500,000	2,500,000	7,188,003	0	0	0	0	0	0
3,513	37,752	662,625	875,459	842,025	50,145	0	0	0	0	0	0
-	-	-	-	-	-	0	0	0	0	0	0
-	-	-	-	-	-	0	0	0	0	0	0
49,425	4,721,116	72,792,118	98,408,685	93,582,702	8,608,436	-	-	-	-	-	-

Oct-20	Nov-20	Dec-20	Jan-21	Feb-21	Mar-21	Apr-21	May-21	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21
4,049	990	990	1,016	831	831	831	831	831	-	-	-	-	-	-
660,234	577,024	417,439	262,026	251,331	233,407	192,414	111,114	35,928	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84,741	69,324	69,324	71,177	38,227	8,612	5,276	5,276	5,276	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
886,005	692,779	232,372	4,731	4,731	4,731	4,731	4,731	4,731	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5,422,547	4,223,879	1,367,966	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19,444	19,444	19,444	19,444	19,444	19,444	19,444	19,444	19,444	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	2,500,000	-	-	-	-	-	7,188,003	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
65,401	53,605	28,805	13,558	11,805	9,903	8,130	4,878	1,871	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7,142,421	**5,637,044**	**4,636,341**	**371,952**	**326,369**	**276,929**	**230,827**	**146,274**	**7,256,084**	-	-	-	-	-	-

INSTALLER	CURRENT_FORM	FUTURE_FORM	TOU_STATUS	CELLULAR_STATUS	MTR_QTY
DUKE	3S 10	3S 20	NON-TOU	IPV6	6
DUKE	3S 10	3S 20	NON-TOU	DIRECT CONNECT	1
DUKE	3S 20	3S 20	NON-TOU	IPV6	22573
DUKE	3S 20	3S 20	NON-TOU	DIRECT CONNECT	1395
DUKE	5A 10	5S 20	NON-TOU	IPV6	104
DUKE	5A 10	5S 20	NON-TOU	DIRECT CONNECT	31
DUKE	5A 20	5S 20	NON-TOU	IPV6	225
DUKE	5A 20	5S 20	NON-TOU	DIRECT CONNECT	50
DUKE	5S 10	5S 20	NON-TOU	IPV6	1
DUKE	5S 20	5S 20	NON-TOU	IPV6	5919
DUKE	5S 20	5S 20	NON-TOU	DIRECT CONNECT	533
DUKE	9A 10	9S 20	NON-TOU	IPV6	37
DUKE	9A 10	9S 20	NON-TOU	DIRECT CONNECT	9
DUKE	9A 20	9S 20	NON-TOU	IPV6	91
DUKE	9A 20	9S 20	NON-TOU	DIRECT CONNECT	15
DUKE	9S 10	9S 20	NON-TOU	IPV6	8
DUKE	9S 10	9S 20	NON-TOU	DIRECT CONNECT	1
DUKE	9S 20	9S 20	NON-TOU	IPV6	13666
DUKE	9S 20	9S 20	NON-TOU	DIRECT CONNECT	998
DUKE	9S 200	9S 20	NON-TOU	IPV6	531
DUKE	9S 200	9S 20	NON-TOU	DIRECT CONNECT	21
DUKE	10A 20	9S 20	NON-TOU	IPV6	6
DUKE	10A 20	9S 20	NON-TOU	IPV6	62
DUKE	10A 20	9S 20	NON-TOU	DIRECT CONNECT	1
DUKE	10A 20	9S 20	NON-TOU	DIRECT CONNECT	6
DUKE	10S 20	9S 20	NON-TOU	IPV6	1
DUKE	16K 480	9S 20	NON-TOU	IPV6	142
DUKE	16K 480	9S 20	NON-TOU	IPV6	2205
DUKE	16K 480	9S 20	NON-TOU	DIRECT CONNECT	11
DUKE	16K 480	9S 20	NON-TOU	DIRECT CONNECT	76
DUKE	16S 480	9S 20	NON-TOU	IPV6	4
DUKE	16S 480	9S 20	NON-TOU	DIRECT CONNECT	2
DUKE	25S 320	9S 20	NON-TOU	IPV6	1
DUKE	25S 320	9S 20	NON-TOU	IPV6	55
DUKE	25S 320	9S 20	NON-TOU	DIRECT CONNECT	1
DUKE	25S 320	9S 20	NON-TOU	DIRECT CONNECT	1
DUKE	1S 100	1S 200	TOU	IPV6	1073
DUKE	1S 100	1S 200	TOU	DIRECT CONNECT	68
DUKE	1S 200	1S 200	TOU	IPV6	7
DUKE	1S 200	1S 200	TOU	DIRECT CONNECT	2
DUKE	2S 200	2S 200	TOU	IPV6	4956
DUKE	2S 200	2S 200	TOU	DIRECT CONNECT	216
DUKE	2S 320	2S 320	TOU	IPV6	23715
DUKE	2S 320	2S 320	TOU	DIRECT CONNECT	1246
DUKE	3S 20	3S 20	TOU	IPV6	5159
DUKE	3S 20	3S 20	TOU	DIRECT CONNECT	307
DUKE	5A 20	5S 20	TOU	IPV6	30
DUKE	5A 20	5S 20	TOU	DIRECT CONNECT	5
DUKE	5S 20	5S 20	TOU	IPV6	2077
DUKE	5S 20	5S 20	TOU	DIRECT CONNECT	191
DUKE	9A 20	9S 20	TOU	IPV6	72
DUKE	9A 20	9S 20	TOU	DIRECT CONNECT	15
DUKE	9S 20	9S 20	TOU	IPV6	11613
DUKE	9S 20	9S 20	TOU	DIRECT CONNECT	632
DUKE	9S 200	9S 20	TOU	IPV6	99
DUKE	9S 200	9S 20	TOU	DIRECT CONNECT	1
DUKE	10A 20	9S 20	TOU	IPV6	7
DUKE	10A 20	9S 20	TOU	DIRECT CONNECT	2
DUKE	12S 200	12S 200	TOU	IPV6	18
DUKE	12S 320	12S 320	TOU	IPV6	4
DUKE	14S 200	16S 320	TOU	IPV6	2
DUKE	15S 480	16S 320	TOU	IPV6	31
DUKE	15S 480	16S 320	TOU	DIRECT CONNECT	2
DUKE	16K 480	9S 20	TOU	IPV6	657
DUKE	16K 480	9S 20	TOU	DIRECT CONNECT	7
DUKE	16S 200	16S 320	TOU	IPV6	10
DUKE	16S 320	16S 320	TOU	IPV6	1937
DUKE	16S 320	16S 320	TOU	DIRECT CONNECT	43
DUKE	16S 480	9S 20	TOU	IPV6	35
DUKE	16S 480	9S 20	TOU	DIRECT CONNECT	4
DUKE	25S 320	9S 20	TOU	IPV6	92
DUKE	25S 320	9S 20	TOU	DIRECT CONNECT	2

INSTALLER	CURRENT_FORM	FUTURE_FORM	TOU_STATUS	CELLULAR_STATUS	MTR_QTY
CONTRACTOR	1S 100	1S 200	NON-TOU	IPV6	88
CONTRACTOR	1S 100	1S 200	NON-TOU	IPV6	2259
CONTRACTOR	1S 100	1S 200	NON-TOU	DIRECT CONNECT	6
CONTRACTOR	1S 100	1S 200	NON-TOU	DIRECT CONNECT	156
CONTRACTOR	1S 200	1S 200	NON-TOU	IPV6	2
CONTRACTOR	2S 200	2S 200	NON-TOU	IPV6	4651
CONTRACTOR	2S 200	2S 200	NON-TOU	IPV6	1299013
CONTRACTOR	2S 200	2S 200	NON-TOU	DIRECT CONNECT	564
CONTRACTOR	2S 200	2S 200	NON-TOU	DIRECT CONNECT	50011
CONTRACTOR	2S 320	2S 320	NON-TOU	IPV6	548
CONTRACTOR	2S 320	2S 320	NON-TOU	IPV6	37067
CONTRACTOR	2S 320	2S 320	NON-TOU	DIRECT CONNECT	69
CONTRACTOR	2S 320	2S 320	NON-TOU	DIRECT CONNECT	1880
CONTRACTOR	12S 200	12S 200	NON-TOU	IPV6	142
CONTRACTOR	12S 200	12S 200	NON-TOU	IPV6	27444
CONTRACTOR	12S 200	12S 200	NON-TOU	DIRECT CONNECT	2
CONTRACTOR	12S 200	12S 200	NON-TOU	DIRECT CONNECT	34
CONTRACTOR	12S 320	12S 320	NON-TOU	IPV6	5
CONTRACTOR	12S 320	12S 320	NON-TOU	IPV6	12
CONTRACTOR	15S 200	16S 320	NON-TOU	IPV6	1
CONTRACTOR	15S 480	16S 320	NON-TOU	IPV6	2
CONTRACTOR	16S 200	16S 320	NON-TOU	IPV6	222
CONTRACTOR	16S 200	16S 320	NON-TOU	IPV6	10438
CONTRACTOR	16S 200	16S 320	NON-TOU	DIRECT CONNECT	13
CONTRACTOR	16S 200	16S 320	NON-TOU	DIRECT CONNECT	283
CONTRACTOR	16S 320	16S 320	NON-TOU	IPV6	499
CONTRACTOR	16S 320	16S 320	NON-TOU	IPV6	16275
CONTRACTOR	16S 320	16S 320	NON-TOU	DIRECT CONNECT	44
CONTRACTOR	16S 320	16S 320	NON-TOU	DIRECT CONNECT	400

EXHIBIT E

APPENDIX C

ENTER DATA **REDACTED**

		Total	2018 1/31/2018	2018 2/28/2018	2018 3/31/2018	2018 4/30/2018	2018 5/31/2018	2018 6/30/2018	2018 7/31/2018	2018 8/31/2018	2018 9/30/2018	2018 10/31/2018	2018 11/30/2018	2018 12/31/2018
AMI Meters - Purchased		1,555,256	100	0	17,000	32,000	39,000	43,500	44,500	48,000	47,000	51,000	46,900	43,500
AMI Meters - Installed		1,555,256	100	0	17,000	32,000	39,000	43,500	44,500	48,000	47,000	51,000	46,900	43,500
Duke Installed	6.631%	103,124	7	0	1,127	2,122	2,586	2,884	2,951	3,183	3,116	3,382	3,110	2,884
Contractor Installed		1,452,132	93	0	15,873	29,878	36,414	40,616	41,549	44,817	43,884	47,618	43,790	40,616
% Complete		100.00%	0.01%	0.00%	1.09%	2.06%	2.51%	2.80%	2.86%	3.09%	3.02%	3.28%	3.02%	2.80%
			0.01%	0.01%	1.10%	3.16%	5.66%	8.46%	11.32%	14.41%	17.43%	20.71%	23.73%	26.52%
Sockets (for A and K based meters)	0.000%	3,866	0	0	232	232	232	232	232	232	232	232	232	232
% Complete		100.00%	0.00%	0.00%	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%
			0.00%	0.00%	6.00%	12.00%	18.00%	24.00%	30.00%	36.00%	42.00%	48.00%	54.00%	60.00%
Connected Grid Routers	0.193%	2,475	1	0	40	69	82	92	94	101	99	105	97	91
% Complete		100.00%	0.04%	0.00%	1.62%	2.79%	3.31%	3.72%	3.80%	4.08%	4.00%	4.24%	3.92%	3.68%
			0.04%	0.04%	1.66%	4.44%	7.76%	11.47%	15.27%	19.35%	23.35%	27.60%	31.52%	35.19%
Range Extenders	0.900%	10,000	1	0	0	0	0	391	400	432	423	459	422	391
% Complete		100.00%	0.01%	0.00%	0.00%	0.00%	0.00%	3.91%	4.00%	4.32%	4.23%	4.59%	4.22%	3.91%
			0.01%	0.01%	0.01%	0.01%	0.01%	3.92%	7.92%	12.24%	16.47%	21.06%	25.28%	29.19%
SSN network devices	0.000%	2,400	0	0	0	0	0	0	0	0	0	0	0	0
% Complete		100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
			0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Overall % Complete		1,573,997	0.01%	0.00%	1.10%	2.05%	2.50%	2.81%	2.87%	3.10%	3.03%	3.29%	3.03%	2.81%
		100.00%	0.01%	0.01%	1.10%	3.16%	5.65%	8.46%	11.34%	14.43%	17.47%	20.76%	23.79%	26.60%

	2019 1/31/2019	2019 2/28/2019	2019 3/31/2019	2019 4/30/2019	2019 5/31/2019	2019 6/30/2019	2019 7/31/2019	2019 8/31/2019	2019 9/30/2019	2019 10/31/2019	2019 11/30/2019	2019 12/31/2019
AMI Meters - Purchased	47,000	44,273	47,000	48,000	48,500	46,000	50,000	49,000	48,000	50,500	46,000	45,000
AMI Meters - Installed	47,000	44,273	47,000	48,000	48,500	46,000	50,000	49,000	48,000	50,500	46,000	45,000
Duke Installed	3,116	2,936	3,116	3,183	3,216	3,050	3,315	3,249	3,183	3,349	3,050	2,984
Contractor Installed	43,884	41,337	43,884	44,817	45,284	42,950	46,685	45,751	44,817	47,151	42,950	42,016
% Complete	3.02%	2.85%	3.02%	3.09%	3.12%	2.96%	3.21%	3.15%	3.09%	3.25%	2.96%	2.89%
	29.54%	32.39%	35.41%	38.50%	41.62%	44.58%	47.79%	50.94%	54.03%	57.28%	60.23%	63.13%
Sockets (for A and K based meters)	129	129	129	129	129	129	129	129	129	129	129	129
% Complete	3.33%	3.33%	3.33%	3.33%	3.33%	3.33%	3.33%	3.33%	3.33%	3.33%	3.33%	3.33%
	63.33%	66.67%	70.00%	73.33%	76.67%	80.00%	83.33%	86.67%	90.00%	93.33%	96.67%	100.00%
Connected Grid Routers	91	85	91	93	94	89	96	94	93	97	89	87
% Complete	3.68%	3.43%	3.68%	3.76%	3.80%	3.60%	3.88%	3.80%	3.76%	3.92%	3.60%	3.52%
	38.87%	42.30%	45.98%	49.74%	53.54%	57.13%	61.01%	64.81%	68.57%	72.48%	76.08%	79.60%
Range Extenders	423	398	423	432	436	414	450	441	432	454	414	405
% Complete	4.23%	3.98%	4.23%	4.32%	4.36%	4.14%	4.50%	4.41%	4.32%	4.54%	4.14%	4.05%
	33.42%	37.40%	41.63%	45.95%	50.31%	54.45%	58.95%	63.36%	67.68%	72.22%	76.36%	80.41%
SSN network devices	0	0	0	0	0	0	0	0	0	0	0	0
% Complete	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Overall % Complete	3.03%	2.85%	3.03%	3.09%	3.12%	2.96%	3.22%	3.16%	3.09%	3.25%	2.96%	2.90%
	29.62%	32.47%	35.50%	38.59%	41.72%	44.68%	47.90%	51.05%	54.14%	57.40%	60.36%	63.26%

600 CGRs in 2017 from 2019 install

	Total	8/31/2017	9/30/2017	10/31/2017	11/30/2017	12/31/2017
Connected Grid Routers	600	120	120	120	120	120
% Complete	100.00%	20.00%	20.00%	20.00%	20.00%	20.00%
		20.00%	40.00%	60.00%	80.00%	100.00%

Year	Meters	CGR	RFRE
2018	412,500	1,471	2,919
2019	569,273	1,099	5,122
2020	573,483	505	1,959
2021	0	0	0
	1,555,256	3,075	10,000

	AMI	CGR	RFRE
Hardware	[redacted]		
Accessories			
Misc.			
Adders			
	177,546,284	16,602,720	3,889,254
Unit costs	[redacted]		
Less Adders $	105.14		
O&M	(18,626)		

3.82% assumption within total meter count

Meter Type	Total	TOU	Non-TUO	Cellular	Total Cost	Current Form	Future Form	TOU	Non-TUO	Cellular	Total	Itron Meter Type
1S 100	3,650	1,141	2,509	230	0	1S 100	1S 200			0		
1S 200	11	9	2	2	421,920	1S 200	1S 200	1,150	2,511	232	3,661	C1M / C1C
2S 200	1,359,411	5,172	1,354,239	50,791	127,775,211	2S 200	2S 200	5,172	1,354,239	50,791	1,359,411	C2M / C2DC
2S 320	64,525	24,961	39,564	3,195	6,994,302	2S 320	2S 320	24,961	39,564	3,195	64,525	C2M3 / C2C3B
3S 10	7	0	7	1	0	3S 10	3S 20			0		
3S 20	29,434	5,466	23,968	1,702	6,509,461	3S 20	3S 20	5,466	23,975	1,703	29,441	C3M / C3C
5A 10	135	0	135	31	0	5A 10	5S 20			0		
5A 20	310	35	275	55	0	5A 20	5S 20			0		
5S 10	1	0	1	0	0	5S 10	5S 20			0		
5S 20	8,720	2,268	6,452	724	2,051,298	5S 20	5S 20	2,303	6,863	810	9,166	C5M / C5C
9A 10	46	0	46	9	0	9A 10	9S 20			0		
9A 20	193	87	106	30	0	9A 20	9S 20			0		
9S 10	9	0	9	1	0	9S 10	9S 20			0		
9S 20	26,909	12,245	14,664	1,630	0	9S 20	9S 20			0		
9S 200	652	100	552	22	0	9S 200	9S 20			0		
10A 20	84	9	75	9	0	10A 20	9S 20			0		
10S 20	1	0	1	0	6,119,419	10S 20	9S 20	13,238	17,951	1,805	31,189	C9M / C9C
12S 200	27,640	18	27,622	36	3,361,283	12S 200	12S 200	18	27,622	36	27,640	C12NM / C12NC
12S 320	21	4	17	0	4,536	12S 320	12S 320	4	17	0	21	C12M3 / C12C3
14S 200	2	2	0	0	0	14S 200	16S 320			0		
15S 200	1	0	1	0	0	15S 200	16S 320			0		
15S 480	35	33	2	2	0	15S 480	16S 320			0		
16K 480	3,098	664	2,434	94	0	16K 480	9S 20			0		
16S 200	10,966	10	10,956	296	0	16S 200	16S 320			0		
16S 320	19,198	1,980	17,218	487	5,840,839	16S 320	16S 320	2,025	28,177	785	30,202	C16M3 / C16C3
16S 480	45	39	6	6	0	16S 480	9S 20			0		
25S 320	152	94	58	4	0	25S 320	9S 20			0		
	1,555,256	54,337	1,500,919	59,357	159,078,269		Totals	54,337	1,500,919	59,357	1,555,256	
				Per Meter $	102.28							

Duke Installs 103,126 All TOU and some Non-TOU

103,126
0

A based 768
K based 3,098
3,866

SSN

Device Type	Jurisdiction DEF	DEP	Unknown	Totals Grand Total
[illegible]				
Active	199	329		528
Installed	1	2		3
[illegible]				
Active	1157	2056	2	3215
Installed	2	6		8
Grand Total	**1359**	**2393**	**2**	**3754**

INSTALLER	CURRENT_FORM	FUTURE_FORM	TOU_STATUS	CELLULAR_STATUS	MTR_QTY	
CONTRACTOR	1S 100	1S 200	NON-TOU	IPV6	2259	
CONTRACTOR	1S 100	1S 200	NON-TOU	DIRECT CONNECT	156	
CONTRACTOR	1S 200	1S 200	NON-TOU	IPV6	2	
CONTRACTOR	2S 200	2S 200	NON-TOU	IPV6	1299013	
CONTRACTOR	2S 200	2S 200	NON-TOU	DIRECT CONNECT	50011	
CONTRACTOR	2S 320	2S 320	NON-TOU	IPV6	37067	
CONTRACTOR	2S 320	2S 320	NON-TOU	DIRECT CONNECT	1880	
CONTRACTOR	10A 20	9S 20	NON-TOU	IPV6	62	
CONTRACTOR	10A 20	9S 20	NON-TOU	DIRECT CONNECT	6	
CONTRACTOR	10S 20	9S 20	NON-TOU	IPV6	1	
CONTRACTOR	12S 200	12S 200	NON-TOU	IPV6	27444	
CONTRACTOR	12S 200	12S 200	NON-TOU	DIRECT CONNECT	34	
CONTRACTOR	12S 320	12S 320	NON-TOU	IPV6	12	
CONTRACTOR	15S 200	16S 320	NON-TOU	IPV6	1	
CONTRACTOR	15S 480	16S 320	NON-TOU	IPV6	2	
CONTRACTOR	16K 480	9S 20	NON-TOU	IPV6	2205	
CONTRACTOR	16K 480	9S 20	NON-TOU	DIRECT CONNECT	76	
CONTRACTOR	16S 200	16S 320	NON-TOU	IPV6	10438	
CONTRACTOR	16S 200	16S 320	NON-TOU	DIRECT CONNECT	283	
CONTRACTOR	16S 320	16S 320	NON-TOU	IPV6	16275	
CONTRACTOR	16S 320	16S 320	NON-TOU	DIRECT CONNECT	400	
CONTRACTOR	16S 480	9S 20	NON-TOU	IPV6	4	
CONTRACTOR	16S 480	9S 20	NON-TOU	DIRECT CONNECT	2	
CONTRACTOR	25S 320	9S 20	NON-TOU	IPV6	55	
CONTRACTOR	25S 320	9S 20	NON-TOU	DIRECT CONNECT	1	1447689
DUKE	1S 100	1S 200	NON-TOU	IPV6	88	
DUKE	1S 100	1S 200	TOU	IPV6	1073	
DUKE	1S 100	1S 200	NON-TOU	DIRECT CONNECT	6	
DUKE	1S 100	1S 200	TOU	DIRECT CONNECT	68	

DUKE	1S 200	1S 200	TOU	IPV6	7	
DUKE	1S 200	1S 200	TOU	DIRECT CONNECT	2	
DUKE	2S 200	2S 200	NON-TOU	IPV6	4651	
DUKE	2S 200	2S 200	TOU	IPV6	4956	
DUKE	2S 200	2S 200	NON-TOU	DIRECT CONNECT	564	
DUKE	2S 200	2S 200	TOU	DIRECT CONNECT	216	
DUKE	2S 320	2S 320	NON-TOU	IPV6	548	
DUKE	2S 320	2S 320	TOU	IPV6	23715	
DUKE	2S 320	2S 320	NON-TOU	DIRECT CONNECT	69	
DUKE	2S 320	2S 320	TOU	DIRECT CONNECT	1246	
DUKE	3S 10	3S 20	NON-TOU	IPV6	6	
DUKE	3S 10	3S 20	NON-TOU	DIRECT CONNECT	1	
DUKE	3S 20	3S 20	NON-TOU	IPV6	22573	
DUKE	3S 20	3S 20	TOU	IPV6	5159	
DUKE	3S 20	3S 20	NON-TOU	DIRECT CONNECT	1395	
DUKE	3S 20	3S 20	TOU	DIRECT CONNECT	307	
DUKE	5A 10	5S 20	NON-TOU	IPV6	104	
DUKE	5A 10	5S 20	NON-TOU	DIRECT CONNECT	31	
DUKE	5A 20	5S 20	NON-TOU	IPV6	225	
DUKE	5A 20	5S 20	TOU	IPV6	30	
DUKE	5A 20	5S 20	NON-TOU	DIRECT CONNECT	50	
DUKE	5A 20	5S 20	TOU	DIRECT CONNECT	5	
DUKE	5S 10	5S 20	NON-TOU	IPV6	1	
DUKE	5S 20	5S 20	NON-TOU	IPV6	5919	
DUKE	5S 20	5S 20	TOU	IPV6	2077	
DUKE	5S 20	5S 20	NON-TOU	DIRECT CONNECT	533	
DUKE	5S 20	5S 20	TOU	DIRECT CONNECT	191	
DUKE	9A 10	9S 20	NON-TOU	IPV6	37	
DUKE	9A 10	9S 20	NON-TOU	DIRECT CONNECT	9	
DUKE	9A 20	9S 20	NON-TOU	IPV6	91	
DUKE	9A 20	9S 20	TOU	IPV6	72	
DUKE	9A 20	9S 20	NON-TOU	DIRECT CONNECT	15	
DUKE	9A 20	9S 20	TOU	DIRECT CONNECT	15	
DUKE	9S 10	9S 20	NON-TOU	IPV6	8	
DUKE	9S 10	9S 20	NON-TOU	DIRECT CONNECT	1	
DUKE	9S 20	9S 20	NON-TOU	IPV6	13666	
DUKE	9S 20	9S 20	TOU	IPV6	11613	
DUKE	9S 20	9S 20	NON-TOU	DIRECT CONNECT	998	
DUKE	9S 20	9S 20	TOU	DIRECT CONNECT	632	
DUKE	9S 200	9S 20	NON-TOU	IPV6	531	
DUKE	9S 200	9S 20	TOU	IPV6	99	
DUKE	9S 200	9S 20	NON-TOU	DIRECT CONNECT	21	
DUKE	9S 200	9S 20	TOU	DIRECT CONNECT	1	
DUKE	10A 20	9S 20	NON-TOU	IPV6	6	
DUKE	10A 20	9S 20	TOU	IPV6	7	
DUKE	10A 20	9S 20	NON-TOU	DIRECT CONNECT	1	
DUKE	10A 20	9S 20	TOU	DIRECT CONNECT	2	
DUKE	12S 200	12S 200	NON-TOU	IPV6	142	
DUKE	12S 200	12S 200	TOU	IPV6	18	
DUKE	12S 200	12S 200	NON-TOU	DIRECT CONNECT	2	
DUKE	12S 320	12S 320	NON-TOU	IPV6	5	
DUKE	12S 320	12S 320	TOU	IPV6	4	
DUKE	14S 200	16S 320	TOU	IPV6	2	
DUKE	15S 480	16S 320	TOU	IPV6	31	
DUKE	15S 480	16S 320	TOU	DIRECT CONNECT	2	
DUKE	16K 480	9S 20	NON-TOU	IPV6	142	
DUKE	16K 480	9S 20	TOU	IPV6	657	
DUKE	16K 480	9S 20	NON-TOU	DIRECT CONNECT	11	
DUKE	16K 480	9S 20	TOU	DIRECT CONNECT	7	
DUKE	16S 200	16S 320	NON-TOU	IPV6	222	
DUKE	16S 200	16S 320	TOU	IPV6	10	
DUKE	16S 200	16S 320	NON-TOU	DIRECT CONNECT	13	
DUKE	16S 320	16S 320	NON-TOU	IPV6	499	
DUKE	16S 320	16S 320	TOU	IPV6	1937	
DUKE	16S 320	16S 320	NON-TOU	DIRECT CONNECT	44	
DUKE	16S 320	16S 320	TOU	DIRECT CONNECT	43	
DUKE	16S 480	9S 20	TOU	IPV6	35	
DUKE	16S 480	9S 20	TOU	DIRECT CONNECT	4	
DUKE	25S 320	9S 20	NON-TOU	IPV6	1	
DUKE	25S 320	9S 20	TOU	IPV6	92	
DUKE	25S 320	9S 20	NON-TOU	DIRECT CONNECT	1	
DUKE	25S 320	9S 20	TOU	DIRECT CONNECT	2	107567

EXHIBIT E

APPENDIX C

2020	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020
1/31/2020	2/29/2020	3/31/2020	4/30/2020	5/31/2020	6/30/2020	7/31/2020	8/31/2020	9/30/2020	10/31/2020	11/30/2020	12/31/2020
50,000	49,000	53,000	55 000	50,000	56,000	57,000	54,500	52,500	47,500	37,000	11,983
50,000	49,000	53,000	55,000	50,000	56,000	57,000	54,500	52,500	47,500	37,000	11,983
3,315	3,249	3,514	3,647	3,315	3,713	3,780	3,614	3,481	3,150	2,453	794
46,685	45,751	49,486	51,353	46,685	52,287	53,220	50,886	49,019	44,350	34,547	11,189
3.21%	3.15%	3.41%	3.54%	3.21%	3.60%	3.66%	3.50%	3.38%	3.05%	2.38%	0.77%
66.34%	69.49%	72.90%	76.44%	79.65%	83.25%	86 92%	90.42%	93.60%	96.85%	99.23%	100.00%
0	0	0	0	0	0	0	0	0	0	0	0
0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
96	94	102	106	96	11	0	0	0	0	0	0
3.88%	3.80%	4 12%	4.28%	3.88%	0.44%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
83.47%	87.27%	91.39%	95.68%	99.56%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
450	441	477	495	96	0	0	0	0	0	0	0
4.50%	4.41%	4.77%	4.95%	0.96%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
84.91%	89.32%	94.09%	99.04%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100 00%
200	200	200	200	200	200	200	200	200	200	200	200
8.33%	8.33%	8.33%	8.33%	8.33%	8.33%	8.33%	8.33%	8.33%	8.33%	8.33%	8.33%
8.33%	16.67%	25.00%	33.33%	41.67%	50.00%	58.33%	66.67%	75.00%	83.33%	91.67%	100.00%
3.22%	3.16%	3.42%	3.55%	3.20%	3.57%	3.63%	3.48%	3.35%	3.03%	2.36%	0.77%
66.48%	69.64%	73.06%	76.60%	79.80%	83.37%	87.01%	90.48%	93.83%	96.86%	99.23%	100.00%
											Manually Adjusted

2021	2021	2021	2021	2021	2021	2021	2021	2021	2021	2021	2021
1/31/2021	2/28/2021	3/31/2021	4/30/2021	5/31/2021	6/30/2021	7/31/2021	8/31/2021	9/30/2021	10/31/2021	11/30/2021	12/31/2021
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0

User Notes:
1. This worksheet is linked to the Title Block Worksheet for project date information used in Columns J - AF. It looks up Escalation Index information from the [DOE Escalation Rates] tab for Columns R - X. However, you can manually enter in Escalation % information in Columns R - X if you chose to utilize Escalation data from an alternate source.
2. All data fields that are "blue" font, must be keyed in manually. All other fields are formulas. All items to be Escalated must be keyed manually due to the fact that no two projects will escalate costs in a like manner.
3. This sheet is "Optional". It can be used in lieu of keying the Escalation %'s by Work Phase/WBS/Task ID on the Detail Summary Sheet.

Project Name: DEP - AMR to AMI Deployment

Display	Item	Escalation Category	Item Description	Total $'s being Escalated	Apply Escalation	Total Escalation	% of Total	ENTER PLANNED CASH FLOW IN THIS SECTION (per Commodity being Escalated) Year 1 2014	Year 2 2015	Year 3 2016	Year 4 2017	Year 5 2018	Year 6 2019	Year 7 2020	Year 8 2021	Year 9 2022	Year 10 2023
Yes	001.	Grand Total - All Work Phases / WBS / Tasks		29,793,872		1,766,413	5.93%	-	-	-	-	8,612,842	10,587,227	9,493,948	1,099,855	-	-
Yes	002.	Materials - Materials		-		-	0.00%	-	-	-	-	-	-	-	-	-	-
Yes	003.		TBD	-	Yes	-	0.00%	-	-	-	-	-	-	-	-	-	-
Yes	004.		TBD	-	Yes	-	0.00%	-	-	-	-	-	-	-	-	-	-
Yes	005.		TBD	-	Yes	-	0.00%	-	-	-	-	-	-	-	-	-	-
Yes	006.		TBD	-	Yes	-	0.00%	-	-	-	-	-	-	-	-	-	-
Yes	007.		TBD	-	Yes	-	0.00%	-	-	-	-	-	-	-	-	-	-
Yes	008.		TBD	-	Yes	-	0.00%	-	-	-	-	-	-	-	-	-	-
Yes	009.		TBD	-	Yes	-	0.00%	-	-	-	-	-	-	-	-	-	-
Yes	010.		TBD	-	Yes	-	0.00%	-	-	-	-	-	-	-	-	-	-
Yes	011.		TBD	-	Yes	-	0.00%	-	-	-	-	-	-	-	-	-	-
Yes	012.		TBD	-	Yes	-	0.00%	-	-	-	-	-	-	-	-	-	-
Yes	013.	Internal Labor		25,711,776		1,529,512	5.95%	-	-	-	-	7,346,437	9,160,465	8,225,169	979,706	-	-
Yes	014.	Scientific & Laboratory	Project Management	7,312,816	Yes	434,627	5.94%	-	-	-	-	2,240,325	2,399,089	2,317,892	355,509	-	-
Yes	015.	Scientific & Laboratory	Field Services	17,524,233	Yes	1,042,878	5.95%	-	-	-	-	4,829,138	6,484,206	5,637,736	573,153	-	-
Yes	016.	Scientific & Laboratory	Telecom	149,927	Yes	8,138	5.43%	-	-	-	-	59,374	46,769	39,140	4,644	-	-
Yes	017.	Scientific & Laboratory	Billing	724,800	Yes	43,869	6.05%	-	-	-	-	217,600	230,400	230,400	46,400	-	-
Yes	018.		TBD	-	Yes	-	0.00%	-	-	-	-	-	-	-	-	-	-
Yes	019.		TBD	-	Yes	-	0.00%	-	-	-	-	-	-	-	-	-	-
Yes	020.		TBD	-	Yes	-	0.00%	-	-	-	-	-	-	-	-	-	-
Yes	021.		TBD	-	Yes	-	0.00%	-	-	-	-	-	-	-	-	-	-
Yes	022.		TBD	-	Yes	-	0.00%	-	-	-	-	-	-	-	-	-	-
Yes	023.		TBD	-	Yes	-	0.00%	-	-	-	-	-	-	-	-	-	-
Yes	024.	Staff Aug Labor		4,082,096		236,901	5.80%	-	-	-	-	1,266,405	1,426,762	1,268,780	120,149	-	-
Yes	025.	Scientific & Laboratory	Project Management	2,065,066	Yes	112,811	5.46%	-	-	-	-	738,877	738,877	558,894	28,418	-	-
Yes	026.	Scientific & Laboratory	Field Services	1,139,600	Yes	71,738	6.29%	-	-	-	-	264,000	400,400	422,400	52,800	-	-
Yes	027.	Scientific & Laboratory	Telecom	-	Yes	-	0.00%	-	-	-	-	-	-	-	-	-	-
Yes	028.	Scientific & Laboratory	Billing	877,430	Yes	52,352	5.97%	-	-	-	-	263,528	287,486	287,486	38,930	-	-
Yes	029.		TBD	-	Yes	-	0.00%	-	-	-	-	-	-	-	-	-	-
Yes	030.		TBD	-	Yes	-	0.00%	-	-	-	-	-	-	-	-	-	-
Yes	031.		TBD	-	Yes	-	0.00%	-	-	-	-	-	-	-	-	-	-
Yes	032.		TBD	-	Yes	-	0.00%	-	-	-	-	-	-	-	-	-	-
Yes	033.		TBD	-	Yes	-	0.00%	-	-	-	-	-	-	-	-	-	-
Yes	034.		TBD	-	Yes	-	0.00%	-	-	-	-	-	-	-	-	-	-
Yes	035.	#REF!		-		-	0.00%	-	-	-	-	-	-	-	-	-	-
Yes	036.		TBD	-	Yes	-	0.00%	-	-	-	-	-	-	-	-	-	-
Yes	037.		TBD	-	Yes	-	0.00%	-	-	-	-	-	-	-	-	-	-
Yes	038.		TBD	-	Yes	-	0.00%	-	-	-	-	-	-	-	-	-	-
Yes	039.		TBD	-	Yes	-	0.00%	-	-	-	-	-	-	-	-	-	-
Yes	040.		TBD	-	Yes	-	0.00%	-	-	-	-	-	-	-	-	-	-
Yes	041.		TBD	-	Yes	-	0.00%	-	-	-	-	-	-	-	-	-	-
Yes	042.		TBD	-	Yes	-	0.00%	-	-	-	-	-	-	-	-	-	-
Yes	043.		TBD	-	Yes	-	0.00%	-	-	-	-	-	-	-	-	-	-
Yes	044.		TBD	-	Yes	-	0.00%	-	-	-	-	-	-	-	-	-	-
Yes	045.		TBD	-	Yes	-	0.00%	-	-	-	-	-	-	-	-	-	-

		Escalation Index per Year - Based on Published Data from the DOE												Escalation Calculations											
Year 11 2024	Year 12 2025	Year 1 2014	Year 2 2015	Year 3 2016	Year 4 2017	Year 5 2018	Year 6 2019	Year 7 2020	Year 8 2021	Year 9 2022	Year 10 2023	Year 11 2024	Year 12 2025	Year 1 2014	Year 2 2015	Year 3 2016	Year 4 2017	Year 5 2018	Year 6 2019	Year 7 2020	Year 8 2021	Year 9 2022	Year 10 2023	Year 11 2024	Year 12 2025
-	-													-	-	-	-	241,160	592,885	806,986	125,383	-	-	-	-
-	-													-	-	-	-	-	-	-	-	-	-	-	-
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-	-													-	-	-	-	205,700	512,986	699,139	111,686	-	-	-	-
-	-	1.000	1.000	1.000	1.000	1.028	1.056	1.085	1.114	1.143	1.172	1.201	1.230	-	-	-	-	62,729	134,349	197,021	40,528	-	-	-	-
-	-	1.000	1.000	1.000	1.000	1.028	1.056	1.085	1.114	1.143	1.172	1.201	1.230	-	-	-	-	135,216	363,116	479,208	65,339	-	-	-	-
-	-	1.000	1.000	1.000	1.000	1.028	1.056	1.085	1.114	1.143	1.172	1.201	1.230	-	-	-	-	1,662	2,619	3,327	529	-	-	-	-
-	-	1.000	1.000	1.000	1.000	1.028	1.056	1.085	1.114	1.143	1.172	1.201	1.230	-	-	-	-	6,093	12,902	19,584	5,290	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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-	-													-	-	-	-	35,459	79,899	107,846	13,697	-	-	-	-
-	-	1.000	1.000	1.000	1.000	1.028	1.056	1.085	1.114	1.143	1.172	1.201	1.230	-	-	-	-	20,689	41,377	47,506	3,240	-	-	-	-
-	-	1.000	1.000	1.000	1.000	1.028	1.056	1.085	1.114	1.143	1.172	1.201	1.230	-	-	-	-	7,392	22,422	35,904	6,019	-	-	-	-
-	-	1.000	1.000	1.000	1.000	1.028	1.056	1.085	1.114	1.143	1.172	1.201	1.230	-	-	-	-	-	-	-	-	-	-	-	-
-	-	1.000	1.000	1.000	1.000	1.028	1.056	1.085	1.114	1.143	1.172	1.201	1.230	-	-	-	-	7,379	16,099	24,436	4,438	-	-	-	-
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Labor Loaders for Year 2017

(Planning Rates confirmed per Finance email 3/16)

Fringe Benefits	Planning Rates (for 2017 and beyond)	Planning Rates (for 2018 and beyond)
DE Progress	14.92%	(confirm with Finance)
DEBS (Shared Serv. Co.)	21.08%	(confirm with Finance)

Incentive	Planning Rates (for 2017 and beyond)	Planning Rates (for 2018 and beyond)
Average (Non-Union)	10.50%	(confirm with Finance)
Average (Union)	3.00%	(confirm with Finance)

Payroll Tax	Planning Rates (for 2017 and beyond)	Planning Rates (for 2018 and beyond)
Average	7.65%	(confirm with Finance)

Labor Loaders	Planning Rates (for 2017 and beyond)	Planning Rates (for 2018 and beyond)
Shared Serv. Co.	25.32%	(confirm with Finance)
DE Carolinas (T&D/E&TS)	45.00%	(confirm with Finance)
DE Progress (T&D/E&TC)	45.00%	(confirm with Finance)
Affiliate	55.00%	(confirm with Finance)

Fleet Loader	Planning Rates (for 2017 and beyond)	Planning Rates (for 2018 and beyond)
All Jurisdictions	3.00%	(confirm with Finance)

Labor Loaders for Year 2017*

Jurisdiction	Shared Service Co Factor	T&D / E&TS Factor**	Affiliate Factor
DE Progress	1.68	1.78	1.88

** Includes Fringe, Incentive, Payroll & Loaders*

*** Field Operations Employees / Engineering & Supervision*

Shared Service Co.	T&D / E&TC	Affiliate
0.68	0.78	0.88

Fleet Loader for Year 2017*			
All Jurisdictions		1.03	

Fleet Loader		
	0.03	

Material Loaders for Year 2016

(rates per Finance email dated 11/14/16)

Sales / Use Tax* (by State of Use)	Planning Rates (for 2017 and beyond)	Planning Rates (for 2018 and beyond)
North Carlolina	7.00%	(confirm with Finance)
Stores Loading (by Jurisdiction)**	**Planning Rates (for 2017 and beyond)**	**Planning Rates (for 2018 and beyond)**
DE - Progress (SetID 50126)	10.00%	(confirm with Finance)

Working Stock***	Planning Rates (for 2017 and beyond)	Planning Rates (for 2018 and beyond)
All Jurisdictions	5.50%	(confirm with Finance)

DOE Escalation Rates - Base Year 2014

	Nuclear		Scientific & Laboratory		Administration Building & Warehouse		Remediation, Decontamination, and Demolition	
FY	**Rate**	**Index**	**Rate**	**Index**	**Rate**	**Index**	**Rate**	**Index**
2011	2.000	1.000	2.300	1.000	2.600	1.000	2.900	1.000
2012	1.900	1.000	2.200	1.000	2.400	1.000	2.400	1.000
2013	1.900	1.000	2.400	1.000	2.800	1.000	2.900	1.000
2014	2.000	1.000	2.500	1.000	3.000	1.000	3.000	1.000
2015	2.000	1.020	2.600	1.000	3.000	1.030	3.000	1.030
2016	2.100	1.041	2.600	1.000	3.100	1.061	3.100	1.061
2017	2.000	1.061	2.700	1.000	3.200	1.093	3.200	1.093
2018	2.200	1.083	2.800	1.028	3.300	1.126	3.300	1.126
2019	2.100	1.104	2.800	1.056	3.400	1.160	3.400	1.160
2020	2.200	1.126	2.900	1.085	3.500	1.195	3.500	1.195
2021	2.200	1.148	2.900	1.114	3.500	1.230	3.500	1.230
2022	2.200	1.170	2.900	1.143	3.500	1.265	3.500	1.265
2023	2.200	1.192	2.900	1.172	3.500	1.300	3.500	1.300
2024	2.200	1.214	2.900	1.201	3.500	1.335	3.500	1.335
2025	2.200	1.236	2.900	1.230	3.500	1.370	3.500	1.370

2021 - 2025 Rates need to be updated

Note: Lookups for the Escalation Tab are done from the table below (which is linked to the table above)

Industry	FY	Rate	Index
Nuclear	2011	2.000	1.000
Nuclear	2012	1.900	1.000
Nuclear	2013	1.900	1.000
Nuclear	2014	2.000	1.000
Nuclear	2015	2.000	1.020
Nuclear	2016	2.100	1.041
Nuclear	2017	2.000	1.061
Nuclear	2018	2.200	1.083
Nuclear	2019	2.100	1.104
Nuclear	2020	2.200	1.126
Nuclear	2021	2.200	1.148
Nuclear	2022	2.200	1.170
Nuclear	2023	2.200	1.192
Nuclear	2024	2.200	1.214
Nuclear	2025	2.200	1.236
Scientific & Labor	2011	2.300	1.000
Scientific & Labor	2012	2.200	1.000
Scientific & Labor	2013	2.400	1.000
Scientific & Labor	2014	2.500	1.000
Scientific & Labor	2015	2.600	1.000
Scientific & Labor	2016	2.600	1.000
Scientific & Labor	2017	2.700	1.000
Scientific & Labor	2018	2.800	1.028
Scientific & Labor	2019	2.800	1.056
Scientific & Labor	2020	2.900	1.085
Scientific & Labor	2021	2.900	1.114
Scientific & Labor	2022	2.900	1.143
Scientific & Labor	2023	2.900	1.172
Scientific & Labor	2024	2.900	1.201
Scientific & Labor	2025	2.900	1.230
Administration Bu	2011	2.600	1.000
Administration Bu	2012	2.400	1.000
Administration Bu	2013	2.800	1.000
Administration Bu	2014	3.000	1.000
Administration Bu	2015	3.000	1.030
Administration Bu	2016	3.100	1.061
Administration Bu	2017	3.200	1.093
Administration Bu	2018	3.300	1.126
Administration Bu	2019	3.400	1.160
Administration Bu	2020	3.500	1.195
Administration Bu	2021	3.500	1.230
Administration Bu	2022	3.500	1.265
Administration Bu	2023	3.500	1.300
Administration Bu	2024	3.500	1.335
Administration Bu	2025	3.500	1.370
Remediation, De	2011	2.900	1.000
Remediation, De	2012	2.400	1.000
Remediation, De	2013	2.900	1.000
Remediation, De	2014	3.000	1.000
Remediation, De	2015	3.000	1.030
Remediation, De	2016	3.100	1.061
Remediation, De	2017	3.200	1.093
Remediation, De	2018	3.300	1.126
Remediation, De	2019	3.400	1.160
Remediation, De	2020	3.500	1.195
Remediation, De	2021	3.500	1.230
Remediation, De	2022	3.500	1.265
Remediation, De	2023	3.500	1.300
Remediation, De	2024	3.500	1.335
Remediation, De	2025	3.500	1.370

Exhibit F

DEP AMI Benefit Details

All benefits reflect the AMI meter deployment schedule at the time of the initial cost-to-complete analysis and savings were adjusted for inflation. In addition, the benefits align with the expected 15-year service life of the meters. Benefits are scaled up during deployment years based on the deployment schedule and benefits are scaled down as meters reach the end of their expected life.

<u>Reduced Meter Reading Costs</u>
Reduction in drive-by (AMR) and manual meter reading costs enabled by AMI remote reading functionality.
The calculated Meter Reading savings were derived from the DEP Meter Reading budget and reflect that the quantity of reads per meter reader will decrease as AMI is deployed. Thus contract meter read costs are expected to increase per unit by approximately 25% as meter read volumes decrease and geographic dispersion increases. Actual budget impact modeled to lag installation by 6-12 months.

<u>Field Metering (Temp to Capital)</u>

- Field Metering labor allocated to the deployment project will shift O&M dollars to capital project dollars.

<u>Reduced Meter Operations Costs</u>

- Reduce testing/repairs during deployment years & eliminate costs of manual metering reading equipment (handheld maintenance, etc.)
- Comprised of 3 components:
    - Reduction in Meter Testing
    - Reduction in Meter Repair Work
    - Reductions in Meter Reading Equipment costs
- Benefit derived from Meter Operations budget and expected Meter Reading Equipment costs.

<u>Customer Order Cost Reduction</u>

- Reduced customer order field visits for disconnect/reconnect and succession reads as these tasks are automated via AMI Remote Order Fulfillment (ROF) functionality
- Drivers:
    - Off-cycle read orders performed remotely

- Disconnects/reconnects performed remotely
- Inputs:
  - Utilized average annual remote capable customer orders based on based on 2-year completed order volumes by order type .
  - Unit order cost (truck roll) was based on 2016 Contract Pricing and 2016 & 2017 YTD average cost by order type.
  - Impact was modeled to lag installation by at least 6 months to allow for meter certification and network optimization
- Variables:
  - # average annual remote capable orders completed by contractors
  - # average annual remote capable orders completed by employees
  - % of total meters with Remote Disconnect Switch (RDS) based on meter form quantities in scope
  - % of AMI eligible meters within total meter population
  - % of historical ROF success rates
  - Customer Orders overtime budget

<u>Customer Order Cost Reduction (DNP)</u>

- Reduced customer order field visits for non-pay disconnect (NPD) assuming that customer notification regulations can be changed by 2019, allowing for non-pay disconnect orders to be automated via AMI Remote Order Fulfillment (ROF) functionality.
- Drivers:
  - Non-pay Disconnects performed remotely
- Inputs:
  - Utilized average annual remote capable NPD orders based on based on 2-year completed order volumes by order type .
  - Unit order cost (truck roll) was based on 2016 Contract Pricing and 2016 & 2017 YTD average cost by order type.
  - Impact was modeled to lag installation by at least 6 months to allow for meter certification and network optimization
- Variables:
  - # average annual remote capable NPD orders completed by contractors
  - # average annual remote capable NPD orders completed by employees
  - % of total meters with Remote Disconnect Switch (RDS) based on meter form quantities in scope
  - % of AMI eligible meters within total meter population
  - % of historical ROF success rates
  - Customer Orders overtime budget

Exhibit F

Cellular Cost Reduction (SSN Access Points)

- Reduced monthly cellular costs resulting from the removal and decommissioning of Silver Springs Network (SSN) Access Points (AP's)
- Utilized average monthly cellular costs based on 2-year billing history actuals for SSN Access Points
- Variables:
  - Average monthly cellular costs associated with SSN AP's
  - # SSN AP's
  - Projected removal schedule

Reduced Restoration Costs – OK on Arrival:

- Reduced truck rolls required to verify voltage to meter due to ability to remotely verify
- Monthly trouble orders resulting in "ok on arrival" were queried from DOMS (2016)
- Assessed trouble orders resulting in "ok on arrival" by Contractor v. Company-completed orders
- Average unit order cost (truck roll) was based on 2016 Contract Pricing, 2017 Level 1 company labor rate, 2017 Company Fleet rate, and Company v. Contractor-completed orders.
- $ Savings = Average yearly orders X % reduction X Average Unit Cost per order X inflation % X benefit realization %
- Assumed: 90% reduction, $54.61/order average for labor & fleet
- Impact was modeled to lag installation by at least 6 months to allow for meter certification and network optimization

Reduced Restoration Costs – Major Storms:

- Reduced truck rolls required to verify voltage to meter due to ability to remotely verify.
- This benefit was scaled from an AMI project model based on previous AMI deployments. The benefit was allocated on a per meter basis, then multiplied by the number of AMI meters planned for DEP.
- The benefit model included:
  - Trouble orders resulting in "ok on arrival" queried from DOMS
  - $ Savings = ((Labor Cost + Outside Labor Costs) / Number Days Storm Lasted) X Days reduced by AMI X Benefit Realization %
  - Assumed: ½ day reduction, 3 year average actual labor costs

Miscellaneous O&M Savings

- Includes nominal amounts to represent other enabling benefits such as :
  - Improved vegetation management (voltage sag data from meters)

- Reduced customer calls (e.g. reduce repeat calls for start service and reconnect non-pay due to Remote Order Fulfillment functionality and scheduling capabilities)
- Reduced estimated bills

Miscellaneous Capital Savings

- Includes nominal amounts to represent other enabling benefits such as:
  - Improved asset management (aggregate meter data to identify over/under loaded distribution transformers, and stress points in the grid)
  - Ability to leverage meter Volt/Var data to improve placement of capacitor banks

Non-technical Loss Reduction:

- This benefit item represents expected revenue capture during and after the AMI deployment as a result of the increased ability to identify cases of non-performing or under-performing ("slow/stuck") meters from registration erosion, power theft and pilferage by way of either direct tapping, manipulating, or bypassing the meter, non-reading of meters, and misconfigured equipment and installation errors such as mis-wiring, incorrect application of multiplying factors, and defects in CT & PT circuitry.
- Identification of meter or usage irregularities through data analytics and field investigations within operations and during deployment
- Variables:
  - DEP Annual Revenues
  - Revenue Leakage Percentage "Non-Technical Line Loss": 2% (From EPRI 1016049: Advanced Metering Infrastructure Technology, Limiting Non-Technical Distribution Losses in the Future)
  - AMI Enabled Identification: 50% (Potential revenue erosion to be identified by AMI deployment and current analytics capabilities. Further advanced analytics initiatives required to identify remaining 50%. Based on assumptions of the Duke Energy Analytics and Revenue Protection team)
  - AMI Recovery Gain: 80% (Potential recovery gain)
  - Collection Percentage (Amount to be collected from identified revenue erosion through corrective action and back-billing): 60%
  - Benefit Realization (based on the deployment rate)
- $ Savings = Annual Revenue X Non-Technical Line Loss % X AMI Enabled Identification X AMI Recovery Gain X Collection % X Benefit Realization %

Reduced Legacy Meter Failures:

- Full cost of new meter failures captured in project costs. This is full benefit of reduced meter failures due to deployment of new AMI meters (old meters vs. new AMI meters).

Exhibit F

- Inputs:
    - 3-year average meter failures in DEP by failure reason was provided by the Metering Services team
    - Cost of average fully burdened AMR meter: $34.14 + 15% material adders = $39.26
    - Average installation labor cost = $25
    - Material cost inflation assumed at 1%, Labor inflation assumed at 3%
    - Growth in Failure Rate of old meters assumed at 0.03%
- $ Savings = ((Cost of meter X (1+Material Inflation)) + (Cost of installation X (1+Labor Inflation))) X (annual failure rate X (1+Failure Growth Rate)) X Benefit Realization %

DRAFT 6-26-2017

DEP AMI Benefits	2017	2018	2019	2020	2021	2022	2023	2024
Meter Reading Cost Reduction	-	-	400,000	850,000	3,120,000	3,213,600	3,310,008	3,409,308
Field Metering (Temp to Capital)	-	975,000	1,400,000	1,400,000	-	-	-	-
Reduced Meter Operations Costs	-	25,000	100,000	100,000	-	-	-	-
Consumer Order Cost Reduction (e.g. disconnects & reconnects)	-	128,428	1,516,821	2,906,653	3,704,893	3,854,586	3,970,223	4,089,330
Consumer Order Cost Reduction (Non-Pay Disconnects)	-	-	-	734,924	936,753	974,602	1,003,840	1,033,955
Cellular Cost Reduction (SSN Access Points)	-	-	14,715	58,860	117,720	121,252	124,889	128,636
Outage Restoration Cost Reduction - OK on Arrival	-	50,672	224,426	430,062	548,168	570,316	587,426	605,048
Outage Restoration Cost Reduction - Major Storms	-	60,000	293,550	810,900	981,000	1,010,430	1,040,743	1,071,965
Miscellaneous O&M Savings (e.g. Call Center)	-	35,206	372,771	873,113	1,058,007	1,089,747	1,122,440	1,156,113
Miscellaneous Capital Savings	-	11,735	124,257	291,038	352,669	363,249	374,147	385,371
Non-Technical Loss Reduction	-	1,679,758	7,259,075	13,572,782	16,880,299	17,136,061	17,221,742	17,307,850
Reduced Legacy Meter Failures	-	13,089	57,303	108,559	139,333	143,351	147,652	152,081
Total Benefit	**-**	**2,978,888**	**11,762,918**	**22,136,890**	**27,838,842**	**28,477,194**	**28,903,108**	**29,339,658**

Savings reflect AMI deployment schedule at time of business case development (May 2017)
Average annual unit costs and volumes are based on DEP-specific data
3% labor inflation applied annually unless otherwise noted
Benefits do not include customer programs enabled by AMI (Enhanced Customer Solutions)
Benefits align with the expected 15-year service life of the meters. Benefits are scaled up during deployment years based on the deployment schedule and scaled down as meters reach the end of their expected life.

2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	Total
3,511,587	3,616,935	3,725,443	3,837,206	3,952,323	4,070,892	4,193,019	4,318,810	3,858,357	2,192,148	416,008	-	51,995,645
-	-	-	-	-	-	-	-	-	-	-	-	3,775,000
-	-	-	-	-	-	-	-	-	-	-	-	225,000
4,212,010	4,338,370	4,468,521	4,602,577	4,740,654	4,882,874	5,029,360	5,180,241	4,627,945	2,629,395	498,985	-	65,381,865
1,064,974	1,096,923	1,129,831	1,163,725	1,198,637	1,234,596	1,271,634	1,309,783	1,170,140	664,822	126,164	-	16,115,303
132,495	136,470	140,564	144,781	149,124	153,598	158,206	162,952	145,579	82,711	15,696	-	1,988,247
623,200	641,896	661,153	680,987	701,417	722,459	744,133	766,457	684,741	389,040	73,829	-	9,705,429
1,104,124	1,137,248	1,171,365	1,206,506	1,242,701	1,279,982	1,318,382	1,357,933	1,213,156	689,262	130,802	-	17,120,052
1,190,796	1,226,520	1,263,316	1,301,215	1,340,252	1,380,459	1,421,873	1,464,529	1,308,387	743,368	141,070	-	18,489,182
396,932	408,840	421,105	433,738	446,751	460,153	473,958	488,176	436,129	247,789	47,023	-	6,163,061
17,394,390	17,481,361	17,568,768	17,656,612	17,744,895	17,833,620	17,922,788	18,012,402	15,701,413	8,704,326	1,611,742	-	258,689,884
156,644	161,343	166,184	171,169	176,304	181,593	187,041	192,652	172,112	97,787	18,557	-	2,442,755
29,787,151	**30,245,906**	**30,716,249**	**31,198,518**	**31,693,058**	**32,200,227**	**32,720,394**	**33,253,936**	**29,317,960**	**16,440,648**	**3,079,877**	**-**	**452,091,422**

DEP AMI Benefit Realization

Meters in Scope	1,555,000
Total Meters	1,563,000
Start	Q3 2016
End	Q2 2019

Data as of 5/9/2017, SGDB

	2017	2018	2019	2020	2021	2022
AMI Installs	-	412,500	569,500	573,000	-	-
Cumulative	-	412,500	982,000	1,555,000	1,555,000	1,555,000
% per Year	0%	26.5%	36.6%	36.8%	-	-
% Cumulative	0%	26.5%	63.2%	100%	100%	100%
Opportunity	0%	13.3%	44.8%	82%	100%	100%
Certified	0%	12.8%	43.6%	80.2%	99.3%	100.0%
Realization	0%	10%	43%	80%	99%	100%

Certification	**Q1 2017**	**Nov 16 -Apr 1**	**Q3-Q4 2016**
Actuals	During Q	6 month	2Q Prev
DEC AMI	92.2%	96.1%	98.9%

**Based on DEC deployment stats as of 5/1/17*

Scale Down	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**
% End of Life	0%	26.5%	36.6%	36.8%	-	-
% Cumulative	0%	26.5%	63.2%	100%	100%	100%
% Scale Down	100%	86.7%	55.2%	18.4%	0%	0%

Exhibit G

REDACTED

Appendix C

Consumer Order Cost Reduction | Remote Order Fulfillment **REDACTED**

Remote Disconnect Switch (RDS) Meter Forms

1S	3,661
2S	1,359,411
12S 200	27,640
Total RDS	1,390,712
Total Meters	1,555,256
% RDS	89.42%
% Successful ROF	98.77%

RDS QTY/Total Meters based on Class 3 scope (data as of 3/17/2017)

Residential Meters in DEP

Res Meters	1,313,107
Total DEP Meters	1,563,018
% Residential	84.01%
% Non-Res	15.99%

Data as of 5/9/2017, SGDB

Exclusions

Exclusions	7,762
Total Meters	1,555,256
% Excluded	0.50%
% AMI Eligible	99.50%

Data as of 5/9/2017, SGDB

Remote Capable Order Volumes & Cost

Type	Employee	Contractor	Total	% Employee	% Contractor	Contractor Unit	Company Unit	Annual Cost	Potential Savings
DISCONNECT	805	84,563	85,368	0.9%	99.1%	[redacted]	$54.84	$746,865	$664,514
RECONNECT	2,727	133,437	136,164	2.0%	98.0%		$54.84	$1,258,410	$1,119,656
RNP	1,456	76,514	77,970	1.9%	98.1%		$54.84	$715,678	$636,767
READ	1,228	5,035	6,263	19.6%	80.4%		$54.84	$109,184	$108,639
CHK VOLTAGE	7,478	1	7,479	100.0%	0.0%		$54.84	$410,102	$408,055
IDLE USAGE	121	2,009	2,130	5.7%	94.3%		$54.84	$23,330	$23,214
TOTAL	13,815	301,559	315,374	4.4%	95.6%		$54.84	$3,263,570	$2,960,846

DEP Contractor vs Duke Customer Order Units - YE 2015, CDO Customer Orders Summary 2016

Remote Capable Non-Pay Disconnects

Type	Employee	Contractor	Total	% Employee	% Contractor	Contractor Unit	Company Unit	Annual Cost	Potential Savings
DNP	483	108,580	109,063	0.4%	99.6%	[redacted]	$54.84	$928,788	$826,378

DEP Contractor vs Duke Customer Order Units - YE 2015, CDO Customer Orders Summary 2016

Overtime Budget 2016

Non-Pay	$143,527
Avoidance	88%
Meter Orders	$226,724
Avoidance	80%
Total	$307,510

2016 Customer Orders Budget provided by Loretta Allen 7/18/2016
Avoidance based on Remote-Capable order volumes, ROF success rate, and AMI eligible scope

Savings	2016	2017	2018	2019	2020	2021	2022
At Full Scale	$3,268,355	$3,366,406	$3,467,398	$3,571,420	$3,678,563	$3,788,920	$3,902,587
Successful ROF	$3,228,155	$3,324,999	$3,424,749	$3,527,492	$3,633,317	$3,742,316	$3,854,586
Realization	0%	0%	4%	43%	80%	99%	100%
Total Benefit	$0	$0	$128,428	$1,516,821	$2,906,653	$3,704,893	$3,854,586

3% inflation, 98% ROF success rate
ROF functionality will be available in mid-August 2018 with the MDM-CIM Phase 2 Go-Live (only 4.5 months of benefit in 2018)

DNP Potential	2016	2017	2018	2019	2020	2021	2022
At Full Scale	$826,378	$851,169	$876,704	$903,006	$930,096	$957,999	$986,739
Successful ROF	$816,214	$840,700	$865,921	$891,899	$918,656	$946,215	$974,602
Realization	0%	0%	4%	43%	80%	99%	100%
Enabled	0%	0%	0%	0%	80%	99%	100%
Total Benefit	$0	$0	$0	$0	$734,924	$936,753	$974,602

3% inflation, 98% ROF success rate
Assumes regulation requiring truck roll for DNP notification (door hanger) will be eliminated in 2019
ROF functionality will be available in mid-August 2018 with the MDM-CIM Phase 2 Go-Live (only 4.5 months of benefit in 2018)

Final Calculations

Dis/Reconn Benefit = Remote Capable Orders x Unit Cost x % RDS X % AMI Eligible Scope X % ROF Success Rate X % Inflation X % Realization
Other Orders Benefit = Remote Capable Orders x Unit Cost x % AMI Eligible Scope X % ROF Success Rate X % Inflation X % Realization

Outage | OK on Arrival **REDACTED**

Customer Trouble Orders (CTO)

OK on Arrival	10,010
Resolved by DCC	12,861
Total	22,871

DCC Resolved Report 2016 (source: DOMS)

CTO-OK by Resource Type

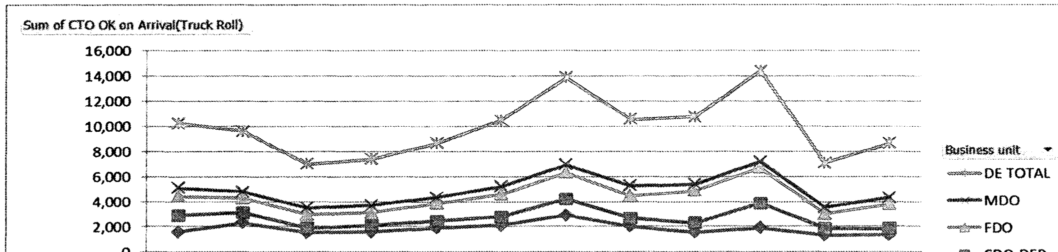
Performer	Units	% Orders
Company	9,960	99.5%
Contractor	50	0.5%
Total	10,010	100%

CDO Customer Orders Summary Dashboard 2016 (source: DOMS)

Average CTO Truck Roll / Order Cost

Cost Driver	Unit Cost
Company Labor	$34.89
Company Fleet	$19.95
Total Company	$54.84
Contractor	[redacted]
Avg Unit Cost	$54.61

Level 1 Labor Rate provided by Amy Futrell 5/12/2017
Fleet Unit Order Cost: Customer Orders Process Reporting Dashboard 2017



	JAN	FEB	MAR	APR	MAY	JUN	JULY	AUG	SEP	OCT	NOV	DEC
DE TOTAL	5,106	4,792	3,500	3,690	4,328	5,222	6,934	5,263	5,374	7,195	3,539	4,330
MDO	696	532	550	549	488	646	639	787	500	491	528	539
FDO	1,515	1,126	1,048	1,005	1,391	1,788	2,089	1,817	2,571	2,840	1,132	1,952
CDO-DEP	1,305	834	366	541	543	691	1,311	647	747	1,972	555	498
CDO-DEC	1,590	2,300	1,536	1,595	1,906	2,097	2,895	2,012	1,556	1,892	1,324	1,341

Month

Avoided CTO Truck Rolls with AMI

Total CTO-OK	10,010
% Avoided	90%
Truck Rolls Avoided	9,009

Savings	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**
Potential	$491,960	$506,719	$521,920	$537,578	$553,705	$570,316
Realization	0%	10%	43%	80%	99%	100%
Total Benefit	$0	$50,672	$224,426	$430,062	$548,168	$570,316

3% inflation, 90% truck roll avoidance

Final Calculations

Reduced Restoration Costs (OK on Arrival) = Annual Trouble Orders Resulting in OK on Arrival x Average Unit Cost x % Avoidance X % Realization

Legacy Meter Failures

Failure Volumes by Retirement Year	2012	2013	2014	2015	2016
MMR ONLY - BLADES HEATED	528	903	3610	4270	9904
MMR ONLY - OUT OF CALIBRATION	7	6	5	14	10
MMR ONLY - ERROR CODE	6	17	31	18	28
MMR ONLY - KWH WILL NOT RESET	12	15	20	37	32
MMR ONLY - LOOSE BOARD	20	10	20	26	18
MMR ONLY - HOT SOCKET BURNT TERMINAL	1448	1338	1589	1536	1248
MMR ONLY - GOOD MMR				1	0
MMR ONLY - NO POWER UP	641	709	1,267	1,607	1,192
MMR ONLY - NO TEST PULSE	6	16	22	21	20
MMR ONLY - FAULTY DISPLAY	80	91	223	285	244
MMR ONLY - BAD ERT	18	38	44	36	40
MMR ONLY - BASE CAPACITOR FAILURE	8	11	11	21	22
Total	798	913	1,643	2,065	1,606

Data provided by Jeff Dargan and Barry Harrington 8/5/2016

Excluded from analysis

Unit Cost & Inflation

Avg MMR Meter	$34.14
Material Adders	15%
Avg Fully Burdened Meter Cost	$39.26
Install Labor	$25.00
Material Inflation	1%
Labor Inflation	3%
Failure Rate Growth	0.03%

Meter cost provided by Jeff Chandler 5/11/2017

Annual Meter Failures

Average	2,000
Potential Saving at Full Scale	128,522

Average Meter Failures provided by Nabil Benwahoud 5/10/2017

Savings	2017	2018	2019	2020	2021	2022
Materials	$78,546	$79,355	$80,172	$80,998	$82,675	$83,526
Labor	$50,015	$51,530	$53,092	$54,701	$58,066	$59,825
Potential	$128,561	$130,885	$133,264	$135,698	$140,740	$143,351
Realization	0%	10%	43%	80%	99%	100%
Total Benefit	$0	$13,089	$57,303	$108,559	$139,333	$143,351

3% inflation, 90% truck roll avoidance

Final Calculation

Reduced Legacy Meter Failures = (Meter Cost + Install Labor) X % Inflation X Average Annual Failures X Failure Growth Rate X % Realization

Non-Technical Line Loss Reduction

Inputs & Assumptions

Annual Revenue[1]	$3,500,000,000
Non-Technical Line Loss[2]	2%
AMI Enabled Identification[3]	50%
Recovery Gain[4]	80%
Collection Rate[5]	60%
Applicable Meters[6]	99.5%
Load Growth	0.5%

[1] *2016 DEP Revenues*

[2] *EPRI 1016049: Advanced Metering Infrastructure Technology, Limiting Non-Technical Distribution Losses in the Future*

[3] *Potential revenue erosion to be identified by AMI deployment and current AMI analytics, RevPro 5-Year Plan, based on industry studies*

[4] *Potential Recovery Gain*

[5] *Amount to be collected from identified revenue erosion through corrective action and back-billing*

[6] *Meters to be deployed of total population*

Savings	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**
Full-Scale Potential	$16,714,012	$16,797,582	$16,881,569	$16,965,977	$17,050,807	$17,136,061
Realization	0%	10%	43%	80%	99%	100%
Total Benefit	$0	$1,679,758	$7,259,075	$13,572,782	$16,880,299	$17,136,061

Final Calculation

Non-Technical Line Loss Reduction = Annual Revenue X % Non-Technical Line Loss X % AMI Enabled Identification X % Recovery Gain X % Collection X Applicable Meters X Load Growth X % Realization

Cellular Cost Reduction | SSN Access Points

Inputs & Assumptions

SSN Access Points Installed	331
Active Access Points	327
Avg Monthly Cellular Cost	$30
Avg Annual Cellular Cost	$360

Access Points: Data as of 3/8/2017 (Source: SSN Utility IQ System, queried by Gary Kubousek)

SSN Cellular Invoices | Actuals

2015 Total	$126,485
2016 Total	$115,806
Avg Monthly Cost	$10,095
Avg Monthly Unit Cost	$30.87
Avg Unit Cost Rounded	$30

Silver Springs AMI Usage & Cost Data 2015-2017 based on cellular invoices (provided by Anne Conners 3/24/2017)

AP Removal Schedule	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**
Qty Removed	-	25	100	175	27	-
% Removed	0%	8%	31%	54%	8%	0%
% Cumulative	0%	8%	38%	92%	100%	100%
Opportunity	0%	4%	27%	92%	100%	100%
Benefit Realization	0%	0%	12.5%	50%	100%	100%

Savings	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**
Full-Scale Potential	$117,720	$117,720	$117,720	$117,720	$117,720	$121,252
Realization	0%	0%	13%	50%	100%	100%
Total Benefit	$0	$0	$14,715	$58,860	$117,720	$121,252

3% inflation applied beginning in 2022 assuming cellular contract pricing to remain flat until renegotiation is required

Final Calculation

Cellular Cost Reduction (SSN AP) = Average Annual Cellular Cost X Active SSN Access Points X % Realization

Metering Benefits

Savings	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**
Meter Reading	$0	$0	$400,000	$850,000	$3,120,000	$3,213,600
Metering (Temp to Capital)	$0	$975,000	$1,400,000	$1,400,000	$0	$0
Meter Operations	$0	$25,000	$100,000	$100,000	$0	$0

Savings provided by Everett Greene (Director of Meter Reading) and Nabil Benwahoud (Director of Field Metering) 5/10/2017
Savings derived from Meter Reading and Field Metering budgets and reflect that the quantity of reads per meter reader will decrease as AMI is deployed
Assumes contractor meter read costs are expected to increase per unit by approximately 25% as meter read volumes decrease and geographic dispersion increases
Actual Meter Reading budget impact modeled to lag installation by 6-12 months
3% inflation applied beginning in 2021